VOLUME 3, NUMBER 5 MAY 1954

# Battelle Technical Review

IN THIS ISSUE:

Advances in Electroplating

# SPECIALIST IN CATALYSIS

JOHN N. PATTISON

"Catalysis is the keystone of large sections of the chemical industry. It is responsible for the production of over half of all organic chemicals worth billions of dollars a year. Yet little is known about the theory of catalysis and the industry depends upon cut-and-try methods for improving its techniques. However, new theories hold great promise for making catalysis a science instead of an art. Emergence of catalysis as a science would enable industries to tailor-make catalysts to fit each job and result in a great expansion of the use of the process."

John N. Pattison, assistant chief in Battelle's chemical research division, thus explains his deep interest in catalysis. Most of John's work since joining Battelle in 1948 has been in this field. His research has included investigations of catalytic methods for the synthesis of hydrazine and various petrochemicals. He has investigated surface areas and porosity of solids, relating these properties to their adsorptive capacity, catalytic activity, and the like. He has also investigated numerous physical and organic chemical problems on tobacco, cellulose, and other materials.

Before his association with Battelle, John served as plant chemist with the American Viscose Corporation and worked on the cotton fellowship at Mellon Institute. Later, as a chemist for the Koppers Company, Incorporated, he studied catalyst problems and assisted in developing new catalytic processes for the manufacture of butadiene and styrene.

After receiving his B.S. degree in chemistry from West Virginia University, John combined graduate work with his professional activity. He received his Ph.D. in chemistry from Purdue University in 1948 having completed his graduate work on a fellowship sponsored by the Harshaw Chemical Company. Since completing his doctorate, John has been author of a number of articles and a chapter on organic catalysis in *An Outline of Organic Chemistry.*

In addition to his professional work, John is now busy with the building of a new home and with community activities. Occasionally he has time to carry on his favorite hobby—bird watching.

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***Asterisks mark items that may be used in the Battelle Library only. None of the unbound materials listed below are available for interlibrary loan.**

## AERONAUTICAL ENGINEERING

**5849 Ramjets for Commercial Transports?** Hendrik Kitsnik. *Aero Digest*, v. 68, Jan. 1954, p. 23-24.

Useful method with high thermal efficiency is discussed. Diagrams, graphs.

**5850 Aircraft Instrument Boom Design.** J. D. Humphreys. *Aero Digest*, v. 68, Jan. 1954, p. 25-27.

Design methods and construction of a nose boom instrument containing pitot and static orifices for measuring pressure, altitude, and indicated airspeed; and vane transducers for measuring angles of attack and sideslip. Graphs, photographs. 4 ref.

**5851* Wings in Prestressed Concrete.** Georges Bruner. *Aeroplane*, v. 86, Jan. 15, 1954, p. 72-77.

Describes in detail an interesting method of casting wings for guided missiles in concrete. Diagrams, photographs.

**5852* Aero-Isoclinic Wing and All-Moving Wing-Tips.** *Aircraft Engineering*, v. 26, Jan. 1954, p. 18-20.

Account of the Short Sherpa and considerations which have led to its design. Photographs, drawings.

**5853* Aircraft Production Conference.** *Aircraft Production*, v. 16, Jan. 1954, p. 14-29.

Includes "The Trend of Design", D. Keith-Lucas; "Production Problems", S. P. Woodley; and "Production Problems", G. H. Dowty. Photographs, diagrams.

**5854 Nuclear Radiation Effects on Aircraft Materials.** Marx D. Moller. *Aviation Age*, v. 21, Jan. 1954, p. 20-23.

Effects of nuclear radiation on materials of concern to the aircraft designer. Diagram, tables.

**5855 How Future's Needs Will Shape Design.** *Aviation Week*, v. 60, Jan. 25, 1954, p. 43-45.

Successful supersonic aircraft depends on meshing new performance criteria with materials and production methods. Drawings.

**5856 Aerobee Rocket Probes Upper Air Riddles.** William J. Coughlin. *Aviation Week*, v. 60, Feb. 1, 1954, p. 30-32.

Secrets of cosmic rays, earth's magnetic field and atmosphere yield to 80 miles-high explorations of Aerojet research missile. Photographs, diagram.

**5857* A Programme for Achieving Interplanetary Flight.** A. V. Cleaver. *British Interplanetary Society, Journal*, v. 13, Jan. 1954, p. 1-27.

Various phases of research and development which must be traversed before interplanetary flight can be achieved are discussed. 19 ref.

**5858* Structural Problems of the Lunar Base.** P. L. Sowerby. *British Interplanetary Soicety, Journal*, v. 13, Jan. 1954, p. 36-40.

Choice of site and surveying in relation to lunar conditions is considered. Use of lunar materials, possibility of making cement from lunar minerals, and uses of concrete on the Moon are also dealt with.

**5859 Analysis of Nonlinear Servos by Phase-Plane-Delta Method.** Robert N. Buland. *Franklin Institute, Journal*, v. 257, Jan. 1954, p. 37-48.

Discusses development and extension of method. Graphs. 6 ref.

**5860 Theory and Practice of Sandwich Construction in Aircraft. A Symposium.** (Annual Volume), v. 16, 1954. 100 p. Institute of Aeronautical Sciences, New York.

Includes "Research on Sandwich Constructions at the Forest Products Laboratory", Charles B. Norris; "The Buckling of Sandwich Structural Elements", N. J. Hoff; "Contributions to the Problem of Structural Analysis of Sandwich-Type Plates and Shells", Eric Reissner; "A Small-Deflection Theory for Flexurally Orthotropic Flat Sandwich Plates", Charles Libove; "Experiences With Sandwich Materials in Air Frames", H. B. Gibbons and Edward MacDonough; "Sandwich Materials Metal Honeycomb Cores", T. P. Pajak and H. C. Engel; "Remarks About the Detail Design and Use of Honeycomb Construction", E. Joseph Weber, and "Use of Sandwich Construction in Military Aircraft", Robert T. Schwartz.

**5861* Similarity Laws for Supersonic Flows.** D. C. Pack and S. I. Pai. *Quarterly of Applied Mathematics*, v. 11, Jan. 1954, p. 377-384.

Non-linear differential equation for velocity potential of three dimensional steady irrotational supersonic flow past wings of finite span has been investigated. Graphs. 10 ref.

**5862 A Method for Calculating the Subsonic Steady-State Loading on an Airplane With a Wing of Arbitrary Plan Form and Stiffness.** W. L. Gray and K. M. Schenk. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3030, Dec. 1953, 120 p. (TL570 Un3t)

Includes graphs, diagrams. 13 ref.

**5863 A Flight Investigation of Laminar and Turbulent Boundary Layers Passing Through Shock Waves at Full-Scale Reynolds Numbers.** Eziaslav N. Harrin. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3056, Dec. 1953, 20 p. (TL570 Un3t)

Includes graphs, photographs. 6 ref.

**5864 A Simplified Mathematical Model for Calculating Aerodynamic Loading and Downwash for Wing-Fuselage Combinations With Wings of Arbitrary Plan Form.** Martin Zlotnick and Samuel W. Robinson, Jr. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3057, Jan. 1954, 38 p. (TL570 Un3t)

Includes diagram, graphs, tables. 9 ref.

**5865 Stresses Around Rectangular Cutouts in Torsion Boxes.** Paul Kuhn and James P. Peterson. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3061, Dec. 1953, 71 p. (TL570 Un3t)

Problem is divided into a "box problem" and a "cover problem." Graphs, diagrams, tables. 5 ref.

## *Aeronautical Engineering*

**5866 One-Dimensional, Compressible, Viscous Flow Relations Applicable to Flow in a Ducted Helicopter Blade.** John R. Henry. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3089, Dec. 1953, 16 p. (TL570 Un3t)

One-dimensional, steady-state, compressible, viscous flow relations are presented which permit determination of flow conditions at any radial position in a ducted helicopter blade. Graphs. 3 ref.

**5867 Hydrodynamic Drag of 12- and 21-Percent-Thick Surface-Piercing Struts.** Claude W. Coffee, Jr. and Robert E. McKann. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3092, Dec. 1953, 28 p. (TL570 Un3t)

Hydrodynamic drag of three surface-piercing untapered struts at approximately 0° angle of yaw was determined at depths up to 6 chords for speeds up to 80 ft. per sec. at various angles of rake. Photographs, tables, graphs. 6 ref.

**5868 Effect of Type of Porous Surface and Suction Velocity Distribution on the Characteristics of a 10.5-Percent-Thick Airfoil With Area Suction.** Robert E. Dannenberg and James A. Weiberg. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3093, Dec. 1953, 59 p. (TL570 Un3t)

An investigation has been made at low speed of the two-dimensional characteristics of a 10.51%-thick symmetrical airfoil with area suction for boundary-layer control near leading edge. Graphs, photographs, tables. 8 ref.

**5869 The Ames 10- by 14-Inch Supersonic Wind Tunnel.** A. J. Eggers, Jr. and George J. Nothwang. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3095, Jan. 1954, 43 p. (TL570 Un3t)

Pertinent features of design and operation are described. Graphs, photographs, diagrams, table. 4 ref.

**5870 Analysis of Multicell Delta Wings on Cal-Tech Analog Computer.** Richard H. MacNeal and Stanley U. Benscoter. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3114, Dec. 1953, 84 p. (TL570 Un3t)

Includes graphs, diagrams, tables. 5 ref.

**5871 Analysis of Sweptback Wings on Cal-Tech Analog Computer.** Richard H. MacNeal and Stanley U. Benscoter. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3115, Jan. 1954, 80 p. (TL570 Un3t)

Structural analyses have been made of two 45° swept wings of aspect ratio three. Graphs, diagrams, tables. 5 ref.

**5872 Design Data for Multipost-Stiffened Wings in Bending.** Roger A. Anderson, Aldie E. Johnson, Jr., and Thomas W. Wilder, III. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3118, Jan. 1954, 31 p. (TL570 Un3t)

Includes graphs, diagrams, tables. 5 ref.

**5873 Static Properties and Resistance Characteristics of a Family of Seaplane Hulls Having Varying Length-Beam Ratio.** Arthur W. Carter and David R. Woodward. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3119, Jan. 1954, 38 p. (TL570 Un3t)

Includes graphs, photographs, tables. 12 ref.

**5874 Span Load Distributions Resulting From Constant Vertical Acceleration for Thin Sweptback Tapered Wings With Streamwise Tips. Supersonic Leading and Trailing Edges.** Isabella J. Cole and Kenneth Margolis. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3120, Jan. 1954, 62 p. (TL570 Un3t)

On the basis of linearized supersonic-flow theory, equations for span load distribution resulting from constant vertical acceleration are derived for a series of thin sweptback tapered wings with streamwise tips. Graphs, diagrams, tables. 7 ref.

**5875 Some Effects of Aspect Ratio and Tail Length on the Contribution of a Vertical Tail to Unsteady Lateral Damping and Directional Stability of a Model Oscillating Continuously in Yaw.** Lewis R. Fisher. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3121, Jan. 1954, 49 p. (TL570 Un3t)

Includes graphs, photographs, diagrams, tables. 10 ref.

**5876 Experimental Investigation at a Mach Number of 2.41 of Average Skin-Friction Coefficients and Velocity Profiles for Laminar and Turbulent Boundary Layers and an Assessment of Probe Effects.** Robert M. O'Donnell. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3122, Jan. 1954, 38 p. (TL570 Un3t)

Includes graphs, diagrams, photographs. 15 ref.

**5877 Effect of Various Arrangements of Triangular Ledges on the Performance of a 23° Conical Diffuser at Subsonic Mach Numbers.** Jerome Persh and Bruce M. Bailey. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3123, Jan. 1954, 36 p. (TL570 Un3t)

Investigation was made to determine whether use of annular ledges to promote turbulent momentum exchange will improve performance of a short, wide-angle diffuser. Graphs, diagrams, table. 4 ref.

**5878 On the Kernel Function of the Integral Equation Relating the Lift and Downwash Distributions of Oscillating Finite Wings in Subsonic Flow.** Charles E. Watkins, Harry L. Runyan, and Donald S. Woolston. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3131, Jan. 1954, 44 p. (TL570 Un3t)

29 ref.

**5879 A Substitute-Stringer Approach for Including Shear-Lag Effects in Box-Beam Vibrations.** William W. Davenport and Edwin T. Kruszewski. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3158, Jan. 1954, 23 p. (TL570 Un3t)

Substitute-stringer approach for including shear lag in calculation of transverse modes and frequencies of box beams is discussed. Graphs, diagrams, table. 4 ref.

### *Books and Miscellaneous Publications*

**5880 Second Convertible Aircraft Congress, Proceedings.** 143 p. 1952. Institute of Aeronautical Sciences, New York. (TL671.2 C65p2)

Includes "New Comments on Configurations", Louis deMonge de Franeau; "Super Speed Converti-Planes for Military and Commercial Use", Alfred I. Roman; "Composite Aircraft With Rotary and Fixed Wing Components", J. A. J. Bennett; "The Operable Model of the S.S.S. Convertoplane", G. P. Herrick; "Jet Propulsion for Convertaplanes", David C. Prince; "Development of Convertiplane", Grover C. Loening; "Basic Design Philosophy", E. Burke Wilford; "The High-Speed Convertiplane", F. M. Gloeckler; "Movies of Free-Flight Model Convertiplane", L. M. Patrick; "Airlines Appraisal of Convertible Aircraft", G. H. Aldrich; "The Position of the Convertible Aircraft in Army Aviation", William B. Bunker; "Impressions of a Newcomer", C. E. Rosendahl; "Medvedeff Monocopter (Convertiplane)", N. J. Medvedeff; "When Will the Converted Plane Come?", Antoine Gazda; and "The Convertaplane—A Historical Resumé and Definition", E. K. Liberatore.

***See also:***
**6483** (wave drag at supersonic speeds)
**6491** (effect of turbulent velocity)
**6492** (turbulent flow)
**6608** (jet engines)
**6649** (vertical velocities of aircraft)
**6698** (sandwich construction)
**6949** (skin-stringer compression panels)
**6996** (aircraft production methods)
**7188** (analyzing extreme-value data)
**7342** (airplane parts treated to withstand high temperatures)

## AGRICULTURE

**5881* Granular Insecticides.** George G. Gyrisco and W. G. Evans. *Agricultural Chemicals*, v. 9, Jan. 1954, p. 32-33.

Granular aldrin, dieldrin, heptachlor, and chlordane gave good results on grubs. Table. 3 ref.

**5882* What's Ahead for the American Farmer?** Richard Russell. *Agricultural Chemicals*, v. 9, Jan. 1954, p. 34-36, 109, 111.

Review of agricultural trends and needs.

**5883* Facts About Spray Residues.** P. J. Chapman. *Agricultural Chemicals*, v. 9, Jan. 1954, p. 37, 119-120.

Discusses harm caused by unfounded claims concerning human poisoning by insecticide residues.

**5884* New Materials and Methods for Fruit Disease Control.** John C. Dunegan. *Agricultural Chemicals*, v. 9, Jan. 1954, p. 38-39, 120, 121.

Lists materials and uses.

**5885* What Are the U. S. Requirements for Cotton Insecticides?** Harold H. Shepard. *Agricultural Chemicals*, v. 9, Jan. 1954, p. 40-43, 111, 113-115.

Includes tables, graphs.

**5886 Insecticidal Action of Heterocyclic Analogs of 2,2,2-Trichloro-1-(*p*-Chlorophenyl)-Ethanol.** R. C. Blinn, F. A. Gunther, and R. L. Metcalf. *American Chemical Society, Journal*, v. 76, Jan. 5, 1954, p. 37-39.

Compounds were prepared and tested as insecticides against four species of insects. Tables. 9 ref.

**5887* Beetle Proofing the Big Timber Country.** O. A. Fitzgerald. *American Forests*, v. 60, Jan. 1954, p. 24-25, 53-56.

Intensive road building program is campaign key to beat billions of bugs that have infested spruce forests of Idaho and Montana. Photographs.

**5888 Chemical Control of Bud Formation in Tobacco Stem Segments.** Carlos Miller and Folke Skoog. *American Journal of Botany*, v. 40, Dec. 1953, p. 768-773.

Discusses results of experimental techniques. Graphs, tables. 9 ref.

**5889 Studies on the Translocation of Foliar-Applied $P^{32}$ and Other Radioisotopes in Bean Plants.** C. A. Swanson and J. B. Whitney, Jr. *American Journal of Botany*, v. 40, Dec. 1953, p. 816-823.

Presents results of experimental studies. Diagrams, graphs, tables. 15 ref.

**5890 Histological Abnormalities of Tubers Formed on Irish Potato Plants Sprayed with Butyl. 2,4,5-Trichlorophenoxyacetate.** Dorothy Bradbury and W. B. Ennis, Jr. *American Journal of Botany*, v. 40, Dec. 1953, p. 827-834.

Describes results of experimental studies. Photographs. 6 ref.

**5891* Effects of Benzenehexachloride on Soil Microorganisms. III. Experiments With Heterotrophic Bacteria.** P. H. H. Gray. *Applied Microbiology*, v. 2, Jan. 1954, p. 37-40.

Includes tables. 4 ref.

**5892* A Critical Evaluation of Inoculums in Composting.** Clarence G. Golueke, Bradley J. Card, and P. H. McGauhey. *Applied Microbiology*, v. 2, Jan. 1954, p. 45-53.

Soil, manure, partially decomposed material, and commercial cultures were tested. Tables, graphs. 18 ref.

**5893* Products of Lightless Fixation of $Co_2$, Which Are Formed in the Plant by Supplying Carbonic Acid Through the Roots.** (Russian.) A. L. Kursanov, N. N. Kriukova, and E. I. Vyskrebentseva. *Biokhimiia*, v. 18, no. 5, Sept.-Oct. 1953, p. 632-637 + 1 plate.

Twelve to 15 day old bean plants were used. Carbonic acid absorbed by the roots quickly changes into carboxylic malic acid. Tables, photograph. 11 ref.

**5894* Effect of 2,4-D on Apparent Photosynthesis and Developmental Morphology of Velvet Bean.** A. J. Loustalot and T. J. Muzik. *Botanical Gazette*, v. 115, Sept. 1953, p. 56-66.

Materials, methods, and results are discussed. Graphs, micrographs. 7 ref.

**5895* Shoot Chimeras After Exposure to Mercurial Compounds.** Eileen W. E. MacFarlane and Alma Marie Messing. *Botanical Gazette*, v. 115, Sept. 1953, p. 66-76.

Results demonstrate that changes in morphology, chlorophyll, and pollen sterility can be induced in somatic tissue of flowering plants when the shoot meristem is treated with the organic mercurials PMOH and PMN. Tables. 18 ref.

**5896* Effect of Kerosene on Movement of 2,4-Dichlorophenoxyacetic Acid and Some Derivatives Through Destarched Bean Plants in Darkness.** Elroy L. Rice and Lawrence M. Rohrbaugh. *Botanical Gazette*, v. 115, Sept. 1953, p. 76-81.

Includes tables, photographs. 6 ref.

**5897* Replacement Control: Changes in Vegetation in Relation to Control of Pests and Diseases.** Robert L. Piemeisel. *Botanical Review*, v. 20, Jan. 1954, p. 1-32.

Examines basis for control rather than to record the many ways in which changes in vegetation of a certain kind may be employed as a means of control. 110 ref.

**5898 Recent Developments in Dairy Chemistry.** F. H. Grimbleby. *Chemical Age*, v. 70, Jan. 9, 1954, p. 131-139.

Composition and constituents of milk and effect of heat on milk are discussed in detail. 88 ref.

**5899* Isolation of a New Plant-Growth Hormone, 3-Indolylacetonitrile.** H. B. Henbest, E. R. H. Jones, and G. F. Smith. *Chemical Society, Journal*, 1953, Dec., p. 3796-3801.

Above, present in about 0.0002% in cabbage, was isolated by partition and chromatographic techniques. Tables, infrared spectrogram. 23 ref.

**5900 Antibiotics and Endocrine Stimulants as Promoters of Growth in Fattening Pigs. II.** R. S. Barber, R. Braude, and K. G. Mitchell. *Chemistry & Industry*, 1954, no. 3, Jan. 16, p. 76.

Investigates value of a supplement consisting of *L*-thyroxine and an antibiotic. Table.

**5901* Antibiotics and Digestion Processes in Hogs. Effect of Aureomycin.** (French.) Geneviève Charlet-Léry, André C. Francois, André M. Leroy, and Jean-P. Vachel. *Comptes rendus*, v. 237, no. 21, Nov. 23, 1953, p. 1355-1357.

No significant effect on digestibility of feed was found. Table. 7 ref.

**5902* Diffusion and Migration of Fertilizer Granules.** (French.) Jean Muller. *Comptes rendus*, v. 237, no. 21, Nov. 23, 1953, p. 1358-1360.

Studies were made in various gels, Si sand, and mud. Table.

**5903* Is Leaf Feeding Practical?** J. F. Davis and R. E. Lucas. *Crops & Soils*, v. 6, Feb. 1954, p. 16-18.

Lack of information has led to exaggerated claims about benefits which may be expected from foliar application of plant food. Photographs.

**5904* Useful Native Plants in the American Southwestern Deserts.** A. Krochmal, S. Paur, and P. Duisberg. *Economic Botany*, v. 8, Jan.-Mar. 1954, p. 3-20.

Scores of plants that grow in the region and contain potentialities are listed. Photographs. 52 ref.

**5905* Pectin. A Product of Citrus Waste.** R. M. McCready and H. S. Owens. *Economic Botany*, v. 8, Jan.-Mar. 1954, p. 29-47.

Availability of citrus wastes, combined with improvements in manufacturing techniques, promises expansion of industries concerned with pectin production and utilization. Table, graph, diagrams, photograph. 102 ref.

**5906* Making More $NH_3$ for the West.** *Farm Chemicals*, v. 117, Jan. 1954, p. 26-27.

Includes photographs.

**5907* Damage to Crops From Parasitic Fungi and Insects.** George L. McNew. *Food Technology*, v. 8, Feb. 1954, p. 75-78.

Use of carefully chosen chemicals to control insects, fungi,

## *Agriculture*

bacteria, nematodes, and weeds has become an absolute necessity. Maps, graphs.

**5908* Ammoniacal Liquor as a Fertilizer.** Arthur Marsden. *Gas Journal*, v. 277, Jan. 13, 1954, p. 91-94.
Fertilizer position in Great Britain; early experiments and criticisms; recent work; and suggestions for the future are covered. Tables, photographs.

**5909* Factors Affecting the Aseptic Culture of Lovell Peach Seedlings.** Dale E. Kester. *Hilgardia*, v. 22, Sept. 1953, p. 335-365.
Discusses results of experimental studies. Photographs, tables, graphs, drawings. 49 ref.

**5910* Crops Other Than Cotton Need Attention From Weed Control Researchers.** *Journal of Agricultural and Food Chemistry*, v. 2, Jan. 20, 1954, p. 54-55.
Southern Weed Conference plan to organize national weed society.

**5911* Granular Herbicides Showing Promise,** *Journal of Agricultural and Food Chemistry*, v. 2, Jan. 20, 1954, p. 55-56.
Experimental use of herbicides on granular Fuller's earth shows promise for control of weeds.

**5912* Potassium Fixation, Differential Fixation of Potassium From Incorporations of Metaphosphate and Sulfate in Two Soils.** W. H. MacIntire, W. M. Shaw, Brooks Robinson, and Claire Veal. *Journal of Agricultural and Food Chemistry*, v. 2, Jan. 20, 1954, p. 85-91.
Includes tables, graphs. 25 ref.

**5913* Urea-Formaldehyde Fertilizers. Condensation Products of Urea and Formaldehyde as Fertilizer With Controlled Nitrogen Availability.** R. D. Kralovec and W. A. Morgan. *Journal of Agricultural and Food Chemistry*, v. 2, Jan. 20, 1954, p. 92-95.
New fertilizers can be compounded so as to release nitrogen at desired rate during growing season. Table, graphs. 15 ref.

**5914* The Effect of Soil Profile Inversion on Tree Growth and Soil Properties.** Robert R. Lindahl and Herbert A. Lunt. *Journal of Forestry*, v. 52, Feb. 1954, p. 96-103.
Discusses results of studies undertaken to obtain more information on nutrient intake and root development of trees. Photographs, diagram, tables, graphs. 33 ref.

**5915* Effect of Feeding DDT-Treated Alfalfa Hay to Swine and of Feeding the Swine Tissues to Rats.** Lorin E. Harris, Joseph R. Harris, Farrin L. Mangelson, Delbert A. Greenwood, Clyde Biddulph, Wayne Binns, and Merthyr L. Miner. *Journal of Nutrition*, v. 51, Dec. 1953, p. 491-505.
Includes tables, graphs. 15 ref.

**5916* Further Evidence as to the Possible Mechanism Involved in the Growth-Promoting Responses Obtained From Antibiotics.** R. L. Jacobs, J. F. Elam, G. W. Anderson, L. L. Gee, Jean Fowler, and J. R. Couch. *Journal of Nutrition*, v. 51, Dec. 1953, p. 507-513.
Includes tables. 10 ref.

**5917* The Comparative Nutritive Value of Corn of High and Low Protein Content for Growth in the Rat and Chick.** H. E. Sauberlich, Wan-Yuin Chang, and W. D. Salmon. *Journal of Nutrition*, v. 51, Dec. 1953, p. 623-635.
Includes tables. 22 ref.

**5918 Correlation Between *p*H-Value of Tomato Tissue and Its Susceptibility to Attack by Two *Fusaria*.** M. K. Tolba and A. M. Saleh. *Nature*, v. 173, Jan. 9, 1954, p. 87.
Experiment was carried out in an attempt to find effect of *p*H-value of tissue of three tomato varieties growing in Egypt. Graphs. 2 ref.

**5919* Natural Enemies and Insecticides That Are Deterimental to Beneficial Syrphidae.** Howard V. Weems, Jr. *Ohio Journal of Science*, v. 54, Jan. 1954, p. 45-54.
Discusses benefits of Syrphidae as pollinators and aphid predators. Considers methods of protection. Table. 26 ref.

**5920* A Simple Aphid Cage for Virus Transmission Studies.** Paul M. Eide and D. M. McLean. *Plant Disease Reporter*, v. 38, Jan. 1954, p. 10-11.
Complete description of aphid cage. Photographs.

**5921* Effect of Fungicides and Spraying Schedules Upon Internal Mold of Chile.** Philip J. Leyendecker, Jr. *Plant Disease Reporter*, v. 38, Jan. 1954, p. 32-34.
Of four spraying schedules, one application applied day after frost with Phygon XL gave best results. Tables, photographs. 3 ref.

**5922* Fungicide-Insecticide Mixtures in Pre-Planting Corm Treatments for Control of Bacterial Scab of Gladiolus.** Roy A. Young. *Plant Disease Reporter*, v. 38, Jan. 1954, p. 55-56.
New 30-second dip-treatment of improved Ceresan, Aldrin, Triton, and a spreader was found effetcive. Table. 4 ref.

**5923* Calcium and Potato Scab.** James G. Horsfall, John P. Hollis, and H. G. M. Jacobson. *Phytopathology*, v. 44, Jan. 1954, p. 19-24.
Field experiments in which variables were calcium and hydrogen ion concentration. Graphs, table. 18 ref.

**5924* Absorption and Translocation of Streptomycin by Bean Plants and Its Effect on the Halo and Common Blight Organisms.** John W. Mitchell, William J. Zaumeyer, and William H. Preston, Jr. *Phytopathology*, v. 44, Jan. 1954, p. 25-30.
Streptomycin was detected in juice from leaves of bean plants following application of streptomycin sulfate to their stems. Tables, photograph, graph.

**5925* Interaction of Salinity Injury, Leaf Age, Fungicide Application, Climate, and Botrytis Cinerea in a Disease Complex of Column Stock.** Kenneth F. Baker, O. A. Matkin, and Lily H. Davis. *Phytopathology*, v. 44, Jan. 1954, p. 39-42.
Includes diagrams. 26 ref.

**5926 Soil Testing a Key to More Efficient Use of Fertilizer.** J. W. Fitts and W. L. Nelson. *Plant Food Journal*, v. 7, Oct.-Nov.-Dec. 1953, p. 6-8.
Summaries of soil tests show general fertility level. Photographs, tables.

**5927* Action of Isopropyl N-Phenyl Carbamate Under Various Conditions.** A. S. Newman and H. T. DeRigo. *Weeds*, v. 2, no. 3, July 1953, p. 169-177.
Presents results of tests on spring and fall sown cereals. Tables. 11 ref.

**5928* Bioecological Problem in Soil Science.** (Russian.) I. I. Tomashevskii. *Pochvovedenie*, 1953, no. 9, Sept., p. 89-97.
Significant changes in water conditions of meadow and meadow-swamp soils was shown to change bioecological conditions of soil. Biological factors were conditioned by activity of microorganisms. Graph, drawing. 7 ref.

**5929* Plant and Soil Studies With Radioactive Manganese.** Evan M. Romney and Stephen J. Toth. *Soil Science*, v. 77, Feb. 1954, p. 107-117.
Absorption and distribution of Mn54 in plants and soils are discussed. Tables, photographs. 12 ref.

**5930* Exchangeable Cations in Soils of California Orange Orchards in Relation to Yield and Size of Fruit and Leaf Composition.** Robert B. Harding. *Soil Science*, v. 77, Feb. 1954, p. 119-127.
Cation contents of soil and leaf tissue were examined. Results are discussed. Tables, graph. 16 ref.

**5931* Influence of Cation-Exchange Reactions on Retention and Availability of Cations in Sandy Soils.** W. F. Spencer. *Soil Science*, v. 77, Feb. 1954, p. 129-136.
Knowledge of adsorption characteristics of a particular soil may be necessary for one to obtain maximum utilization of its exchange capacity in fertilizer conservation. Tables. 18 ref.

**5932* Movement of Water and Chlorides in Relatively Dry Soil.** T. J. Marshall and C. G. Gurr. *Soil Science*, v. 77, Feb. 1954, p. 147-152.
Results are presented for movement of chlorides in a soil, water

content of which is near the wilting percentage. Tables, graphs. 10 ref.

**5933* Some Effects of Isopropyl N-(3-Chlorophenyl) Carbamate and an Alkanolamine Salt of Dinitro Ortho Secondary Butyl Phenol on Germinating Cotton Seeds.** C. R. Swanson, W. C. Shaw, and J. H. Hughes. *Weeds*, v. 2, no. 3, July 1953, p. 178-189.

Includes photographs, tables, graphs. 13 ref.

**5934* Effect of Maleic Hydrazide on Soil Bacteria and Other Microorganisms.** L. G. Nickell and A. R. English. *Weeds*, v. 2, no. 3, July 1953, p. 190-195.

Herbicidal effect on soil microflora. Tables. 25 ref.

*Books and Miscellaneous Publications*

**5935 Hanna's Handbook of Agricultural Chemicals.** Lester W. Hanna. 209 p. 1953. Lester W. Hanna, Forest Grove, Ore. (S585 H19h)

Includes chapters on official antidotes; Federal Food and Drug Administration toxicological information and residue tolerances; trivial code of entomological terms; fertilizers; fumigants, fungicides; herbicides; insecticides; and rodenticides.

*See also:*
**5948** (toxicity of *Alternaria Tenuis* Auct. cultures for mice)
**5956** (production of tobacco mosaic virus)
**6139** (fungistatic rhodanines)
**6448** (livestock marketing survey in Iowa)
**6450** (economic problems of horticultural specialties)
**7374** (salt exchange between ligneous plants and chernozem soils)

## BIOCHEMICAL AND BIOPHYSICAL RESEARCH

**5936* The *in Vitro* Evaluation of the Antibacterial Activity of Sulfonamides.** George M. Naimark and Lesly White. *American Pharmaceutical Association, Journal, (Scientific Ed.)*, v. 43, Jan. 1954, p. 7-8.

Necessity for using bacteriological culture media containing a minimum of sulfonamide-inhibitors and capable of supporting satisfactory growth of the organism is emphasized. Other parameters significant in such bacteriostatic tests are reviewed. 8 ref.

**5937* The Influence of Whole Body X-Irradiation on the Pharmacological Action of Certain Drugs.** Patrick F. Belcastro, John E. Christian, and H. George DeKay. *American Pharmaceutical Association, Journal, (Scientific Ed.)*, v. 43, Jan. 1954, p. 9-12.

Study was made to detect changes in the most prominent pharmacological action of certain drugs after they were administered to rats three days after whole body exposure to 540 roentgens of X-irradiation. Charts, graphs, table. 19 ref.

**5938* The Antibacterial Activity of an Extract Obtained From *Ascophyllum nodosum*.** Diamante D. Vacca and Robert A. Walsh. *American Pharmaceutical Association, Journal, (Scientific Ed.)*, v. 43, Jan. 1954, p. 24-26.

Monthly extracts obtained from *Ascophyllum nodosum* were tested for antibacterial activity *in vitro* against 11 organisms. Seasonal variation in activity of extracts is discussed. Graphs, tables.

**5939* Studies on the Chemotherapy of Experimental Schistosomiasis. II. N-(9-Xanthenyl)amides.** Howard W. Bond and George W. Luttermoser. *American Pharmaceutical Association, Journal (Scientific Ed.)*, v. 43, Jan. 1954, p. 32-35.

Thirty-five N-(9-xanthenyl)amides have been prepared and tested for their activity against experimentally induced *Schistosoma mansoni* in Swiss albino mice. Miracil D has been used as standard of reference. Ten compounds show some activity. None, however, appear to be as active as Miracil D. Tables. 14 ref.

**5940* A Preliminary Phytochemical Study of *Hippomane mancinella* L.** H. J. Schaeffer, W. M. Lauter, and P. A. Foote. *American Pharmaceutical Association, Journal, (Scientific Ed.)*, v. 43, Jan. 1954, p. 43-45.

Phytochemical study was made on *Hippomane mancinella* L. Alpha-carotene and 2-hydroxy-4,6-dimethoxyacetophenone were isolated from the leaves. Most toxic extract was the aqueous extract of the wood. Alcoholic extract was the next most toxic. Toxic constituents were not isolated. Graph, table. 6 ref.

**5941* Microtoxicology. X. Colorimetric Reactions and Optical Crystallographic Properties of Five Synthetic Antispasmodics.** Thomas J. Haley and George L. Keenan. *American Pharmaceutical Association, Journal, (Scientific Ed.)*, v. 43, Jan. 1954, p. 46-48.

Antispasmodics used were Profenil citrate, Syntropan phosphate, Trasentin hydrochloride, Pavatrine hydrochloride, and Lachesine chloride. Tables. 6 ref.

**5942* A Survey of Fungi From the Order *Melanconiales* for Antibiotic Activity.** Franklin R. Cole and Raymond W. Vanderwyk. *American Pharmaceutical Association, Journal, (Scientific Ed.)*, v. 43, Jan. 1954, p. 56-58.

Twenty-six genera including 55 different species of fungi from the order *Melanconiales* were tested for antibiotic activity. Comparison of the value of four broth substrates used in this survey is given. Tables. 3 ref.

**5943* Suggested Improvements in the Weber and Black Method for Evaluating Germicides.** T. W. Humphreys and C. K. Jones. *Applied Microbiology*, v. 2, Jan. 1954, p. 1.

Includes table. 3 ref.

**5944* Studies on the Formation of Acrolein in Distillery Mashes.** Doris E. Mills, W. D. Baugh, and H. A. Conner. *Applied Microbiology*, v. 2, Jan. 1954, p. 9-13.

Discusses factors contributing to formation of this aldehyde including pH substrate, oxygen tension, agitation, presence of yeast cells, mash residue, fermentable sugars, and glycerol. Tables, micrograph. 8 ref.

**5945* Thermal Tolerance Studies on the Heterofermentative Lactobacilli That Cause Greening of Cured Meat Products.** C. F. Niven, Jr., L. G. Buettner, and James B. Evans. *Applied Microbiology*, v. 2, Jan. 1954, p. 26-29.

Degrees of heat resistance in organisms differ, even though they are identical in physiological, serological, and nutritional characteristics. Tables, graphs. 10 ref.

**5946* Time Temperature Studies of Spore Penetration Through an Electric Air Sterilizer.** Herbert M. Decker, Francis J. Citek, J. Bruce Harstad, Noel H. Gross, and Frank J. Piper. *Applied Microbiology*, v. 2, Jan. 1954, p. 33-36.

Includes diagrams, graphs.

**5947* Chemurgy's Ever-Widening Horizons.** *Chemurgic Digest*, v. 12, Dec. 1953, p. 10-11.

Includes photographs.

**5948* On the Toxicity of *Alternaria Tenuis* Auct. Cultures Isolated From *Lolium Temulentum* L. Grains.** (French.) Jean Chaze, Louis Thieblot, and Jean Lagarde. *Comptes rendus*, v. 237, no. 23, Dec. 9, 1953, p. 1572-1574.

Describes toxicity for mice. 3 ref.

**5949* Structure and Function of DNA.** F. H. C. Crick. *Discovery*, v. 15, Jan. 1954, p. 12-17.

Studies on nucleo-proteins and nucleic-acids present in plant and animal cells. Diagrams.

**5950 The Use of Metabolites in the Restoration of the Viability of Heat and Chemically Inactivated *Escherichia Coli*.** F. Heinmets, W. W. Taylor, and J. J. Lehman. *Journal of Bacteriology*, v. 67, Jan. 1954, p. 5-12.

Includes tables. 12 ref.

**5951 Dependence of the Toxicity of Cations for Lactic Acid Bacteria on pH and Incubation Time.** Robert A. MacLeod. *Journal of Bacteriology*, v. 67, Jan. 1954, p. 23-26.

Includes tables. 8 ref.

**5952 Relationship Between Vitamin $B_{12}$ Oxidation Product and Sodium Chloride Toxicity for Lactobacilli.** David Hendlin and Jeanne C. Wall. *Journal of Bacteriology*, v. 67, Jan. 1954, p. 38-40.

Toxicity ascribed to hydrogen peroxide oxidation products of

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vitamin $B_{12}$ has been found to be due to NaCl toxicity. Presence of relatively high levels of salts in microbiological media results in inhibition of growth of several lactobacilli, and in some instances, such inhibition is antagonized by vitamin $B_{12}$. Table, graph. 8 ref.

**5953 Effect of Combinations of Antibiotics on Lysis of *Staphlyococcus Aureus* by Pencillin.** William M. M. Kirby and James M. Burnell. *Journal of Bacteriology*, v. 67, Jan. 1954, p. 50-52.

Includes graphs. 9 ref.

**5954 Potentiation of Inhibitor Action Through Determination of Reversing Metabolites.** Robert F. Pittillo and J. W. Foster. *Journal of Bacteriology*, v. 67, Jan. 1954, p. 53-57.

Includes tables. 15 ref.

**5955 The Production of Acetylmethylcarbinol by *Aerobacter* From a Variety of Carbon Sources in a Synthetic Medium.** Jerome J. Helprin and Michael X. Sullivan. *Journal of Bacteriology*, v. 67, Jan. 1954, p. 90-93.

Study has been made of production, by *Aerobacter aerogenes* and *Aerobacter cloacae*, of acetylmethylcarbinol from a variety of compounds, each of which was the sole C source in a synthetic, chemically defined medium. Table. 21 ref.

**5956 A Screening Test of the Effect of Organic Compounds on Production of Tobacco Mosaic Virus.** David E. Schlegel and T. E. Rawlins. *Journal of Bacteriology*, v. 67, Jan. 1954, p. 103-109.

Includes tables. 13 ref.

**5957* Studies of Metabolic Turnover With Tritium as a Tracer. III. Comparative Studies With Tritium and Deuterium.** Roy C. Thompson and John E. Ballou. *Journal of Biological Chemistry*, v. 206, Jan. 1954, p. 101-107.

Results of experiments on rats given tritium and deuterium oxides over a five-week period. Tables. 17 ref.

**5958* A Papyrographic Technique for the Fractionation, Characterization & Estimation of Antibiotics, Vitamins & Other Active Principles.** D. S. Venkatesh, B. Bheemeswar, and M. Sreenivasaya. *Journal of Scientific & Industrial Research*, v. 12, Sec. A, Dec. 1953, p. 552-557.

A simple experimental technique is discussed. Diagrams, photomicrograph. 21 ref.

**5959* The Place of Phase Contrast in Microbiology.** W. Howard Hughes and P. N. Cardew. *Laboratory Practice*, v. 3, Jan. 1954, p. 10-14.

Includes micrographs. 10 ref.

**5960 Effect of Amino Acids, Especially Aspartic and Glutamic Acid and Their Amides, on the Growth of Datura Stramonium Embryos in Vitro.** Denise Paris, J. Rietsema, S. Satina, and A. F. Blakeslee. *National Academy of Sciences of the United States of America, Proceedings*, v. 39, Dec. 1953, p. 1205-1212.

Experiments on growth of plant embryos have indicated that in media with only one or a few amino acids, embryos grow to a very limited extent. Graphs. 16 ref.

**5961 Cross Reactivation of Genetic Loci of $T_2$ Bacteriophage After Decay of Incorporated Radioactive Phosphorus.** Gunther S. Stent. *National Academy of Sciences of the United States of America, Procedings*, v. 39, Dec. 1953, p. 1234-1241.

Experiments show that an appreciable fraction of $P^{32}$ disintegrations destroying plaque-forming ability of T2 bacteriophage, leave the particle still able to donate some of its genetic characters to progeny of a mixed infection with an undamaged, non-radioactive phage. Table, graph. 12 ref.

**5962* Nonspecificity of the Triple Response for Ethylene.** Paul E. Waggoner and A. E. Dimond. *Science*, v. 119, Jan. 22, 1954, p. 123-124.

Discusses validity of the triple response of etiolated pea seedlings as measure of gaseous ethylene production by living material. Table. 7 ref.

**5963* Antagonist Studies: Comparison of Desoxypyridoxine and Pyridoxine-Deficiency Therapy on Various Vitamin $B_6$ Enzymes.** L. S. Dietrich and Daniel M. Shapiro. *Society for Experimental Biology and Medicine, Proceedings*, v. 84, Dec. 1953, p. 555-558.

Includes tables. 18 ref.

**5964* Observations on the Nature of Radioactive Contaminants in Biosynthetic Cholesterol-$C^{14}$.** Seymour Dayton, Erwin H. Mosbach, and Forrest E. Kendall. *Society for Experimental Biology and Medicine, Proceedings*, v. 84, Dec. 1953, p. 608-609.

6 ref.

**5965* Failure of Light Activated Riboflavin to Counteract the Growth Inhibition of Two Benzoic Acid Derivatives.** Robert H. Hamilton and Richard J. Aldrich. *Weeds*, v. 2, no. 3, July 1953, p. 202-203.

Table. 9 ref.

### *Books and Miscellaneous Publications*

**5966 Advances in Protein Chemistry.** M. L. Anson, Kenneth Bailey, and John T. Edsall, editors. v. III. 529 p. 1953. Academic Press Inc., New York. (QD431 Ad95)

Papers includes "Naturally Occurring Peptides", E. Bricas and Cl. Fromageot; "Peptide Bond Formation", Henry Borsook; "Bacteriophages: Nature and Reproduction", Frank W. Putnam; "Assimilation of Amino Acids by Gram-Positive Bacteria and Some Actions of Antibiotics Thereon", Ernest F. Gale; "Peanut Protein Isolation, Composition, and Proprties", Jett C. Arthur, Jr., "Rotational Brownian Motion and Polarization of the Fluorescence of Solutions", Gregorio Weber; and "Zone Electrophoresis", Arne Tiselius and Per Flodin.

**5967 Biochemistry and Physiology of Nutrition.** Goeffrey H. Bourne and George W. Kidder. v. I-II. 569 and 641 p. 1953. Academic Press, New York. (QP141 B66b)

Volume I includes "The Early Development of the Science of Nutrition", E. P. Cathcart; "The History of Vitamins", Leslie J. Harris; "Water and Electrolyte Metabolism", R. L. Zwemer; "Carbohydrate Metabolism", T. L. Sourkes; "Amino Acids", Alton Meister; "The Biosynthesis of Proteins", Henry Borsook and Clara L. Deasy; "Lipid Metabolism", A. C. Frazer; "The Fat-Soluble Vitamins (With Special Reference to the Requirements of Different Animals)", Thomas Moore; "The Vitamin B Complex", S. K. Kon and J. W. G. Porter; "Vitamins and Hematopoiesis", T. H. Jukes; and "Vitamin C", B. B. Lloyd and H. M. Sinclair. In volume II papers are "Structural Changes in Vitamin Deficiency" and "The Intracellular Localization by Histochemical Methods of Enzymes and Vitamins", Geoffrey H. Bourne; "Microbiology of Digestion", D. P. Cuthbertson and A. T. Phillipson; "The Nutrition of Invertebrate Animals", George W. Kidder; "Energetics and Metabolic Function", Eugene P. Kennedy; "Hydrolytic and Phosphorolytic Enzymes", Warren H. Yudkin; "The Respiratory Enzymes", B. L. Horecker and A. Kornberg; "Coenzymes", G. David Novelli and Morris Soodak; "Iron Metabolism", H. F. W. Kirkpatrick; "Calcium and Phosphorus Metabolism", H. F. W. Kirkpatrick and J. Douglas Robertson; "Trace Elements", E. J. Underwood; and "Applications of Human Nutrition", Grace A. Goldsmith.

**5968 Advances in Cancer Research.** Jesse P. Greenstein and Alexander Haddow, editors. v. I. 590 p. 1953. Academic Press, Inc., New York. (RC261 Ad95)

Contains "Electronic Configuration and Carcinogenesis", C. A. Coulson; "Epidermal Carcinogenesis", E. V. Cowdry; "The Milk Agent in the Origin of Mammary Tumors in Mice", L. Dmochowski; "Hormonal Aspects of Experimental Tumorigenesis", W. U. Gardner; "Properties of the Agent of Rous No. 1 Sarcoma", R. J. C. Harris; "Applications of Radioisotopes to Studies of Carcinogenesis and Tumor Metabolism", Charles Heidelberger; "The Carcinogenic Aminoazo Dyes", James A. Miller and Elizabeth C. Miller; "The Chemistry of Cytotoxic Alkylating Agents", W. C. J. Ross; "Nutrition in Relation to Cancer", Albert Tannenbaum; and "Plasma Proteins in Cancer", Richard J. Winzler.

**5969 Biochemical Preparations.** Esmond E. Snell, editor. v. III. 128 p. 1953. John Wiley & Sons, Inc. (QP509 B52p)

Covers crystalline muscle phosphorylase; ribonuclease; diphosphopyridine nucleotide (DPN); triphosphopyridine nucleotide (TPN); pyridoxamine phosphate; pyridoxal phosphate; protoporphyrin dimethyl ester; *d*-isocitric acid; *dl*-isocitric acid lactone; dihydroxyfumaric and oxalacetic acid; *L*(+) and *D*(—)lactic acids; solium α-ketoisocaproate; *D*-glucose-6-phosphoric and *D*-galacturonic acids; β-2,5-dihydroxyphenyl-*DL*-alanine; *L*-isoleucine, *D*-isoleucine, *L*-alloisoleucine, and *D*-alloisoleucine; *L*- and *DL*-ornithine monohydrochlorides; *L*- and *DL*-citrulline (from ornithine); *L*-citrulline (from *L*-arginine); *L*-kynurenine; *L*- and *D*-penicillamine hydrochlorides; elaidic acid; and 2,4-dinitrofluorobenzene.

*See also:*
**5891** (effects of BHC on soil microorganisms)
**5928** (bioecological problems in soil science)
**6066** (manufacture of antibodies)
**6498** (organisms in frozen vegetables)
**6640** (specimen holder for low-temp. microscopy)
**7111** (biological aspects of ultrasonic)
**7263** (development of dextran)

## CERAMICS AND CONCRETE

**5970 Insulating Firebrick in Periodic Kilns.** Walter F. Creson and John W. Moffat. *American Ceramic Society, Bulletin,* v. 33, Jan. 1954, p. 4-7.

Progress reports on structural clay products plants is presented. Photographs, diagrams, graph. 3 ref.

**5971 Application of the Laws of Chance to Problems Involving Defects in Optical Glass. II. Striae.** John C. Martino. *American Ceramic Society, Bulletin,* v. 33, Jan. 1954, p. 8-11.

From mathematical derivations presented, an integrated inspection and processing techniques was developed which, without benefit of an improvement in intrinsic quality of the glass-melt, will yield striae-free optical elements in quantities greatly in excess of those obtainable by conventional techniques. Table, graph.

**5972 Control Tests for Glazed Structural Tile.** Paul D. Martino. *American Ceramic Society, Bulletin,* v. 33, Jan. 1954, p. 13-15.

Several tests used in the structural tile products industry for improving quality of ware. Diagram, graph. 10 ref.

**5973* Effect of Age of Concrete on Its Resistance to Scaling Caused by Using Calcium Chloride for Ice Removal.** W. C. Hansen. *American Concrete Institute, Journal,* v. 25, Jan. 1954, p. 341-351; *ACI Proceedings,* v. 50, 1954, p. 341-351.

Describes results of experimental studies. Tables, photograph. 6 ref.

**5974* Studies on the Cementitious Phases of Autoclaved Concrete Products Made of Different Raw Materials.** George L. Kalousek. *American Concrete Institute, Journal,* v. 25, Jan. 1954, p. 365-378; *ACI Proceedings,* v. 50, 1954, p. 365-378.

Physical tests on sand and gravel units, made with different constant-weight mixtures of lime and cement in fixed proportions to the aggregate, indicated that strength was directly proportional to unit weight of the raw block. Tables, graph. 12 ref.

**5975* Properties of Concrete and Their Influence on Prestress Design.** Raymond E. Davis and G. E. Troxell. *American Concrete Institute, Journal,* v. 25, Jan. 1954, p. 381-391; *ACI Proceedings,* v. 50, 1954, p. 381-391.

Discusses uniformity of concrete quality and factors influencing shrinkage and creep. 11 ref.

**5976 Select Refractories for the Job They Must Do.** S. W. Swain. *Brick & Clay Record,* v. 124, Jan. 1954, p. 94-95, 97-99, 101, 103-104, 109.

Close inspection of worn refractories indicates weakness. Knowing defects, specific refractories with the right properties can be selected. Heat capacities are discussed. Graphs. 5 ref.

**5977* Continental Practice in the Use of Refractory Concrete for Brick Kilns.** T. D. Robson. *British Clayworker,* v. 62, Jan. 1954, p. 302-310.

Chief reasons for growing Continental use of refractory concrete in brick and tiles works appear to be speed; convenience and economy of operation; and long life of product. Strength and particularly thermal shock resistance of refractory concrete are considered to be main factors contributing towards durability. Photographs, diagrams.

**5978* Electrical Heating of Screens.** *British Clayworker,* v. 62, Jan. 1954, p. 311-313.

Use of step-down transformers, a heavy electric current is passed through the mesh wires, at low voltage. Resistance of the wire raises temperature of the mesh, thus providing a uniform heat over the complete area of the screen. Photographs.

**5979* Attempts to Improve the Duration of Converter Bottoms and Linings.** (French.) M. Calaque. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques,* 1953, no. 12, p. 1915-1922.

Results of tests with baking tar held at 110 C for 24 hr. Describes tests with dolomites. Tables, graphs.

**5980* Dolomite Linings in a Basic Bessemer Steel Plant.** (French.) Recht. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques,* 1954, no. 1, p. 153-162.

Discusses experiments using dolomite and tar in linings to improve operation of the furnaces.

**5981 Ceramic Cores for Deposited Carbon Resistors.** M. D. Rigterink. *Ceramic Age,* v. 63, Jan. 1954, p. 10-12.

Paper from Symposium on Ceramic Dielectrics, Rutgers University, Feb. 1953. Reviews requirements in manufacture emphasizing importance of control in order to obtain desirable characteristics. Photograph, micrograph, graphs.

**5982 A Study of Glass Furnace Refractories. II.** W. L. Fabianic. *Ceramic Industry,* v. 62, Feb. 1954, p. 57-58.

Discusses design and application of various types of ports. Diagrams. (To be continued.)

**5983 1953 Glass Indusrty in Review.** H. E. Simpson. *Ceramic Industry,* v. 62, Feb. 1954, p. 68-69, 71, 93.

Survey reveals undercurrent of activity throughout the glass industry that points to years of high production in all lines. Photographs, table. (To be concluded.)

**5984 Factors Influencing Control of Color in Amber Glasses. II.** R. W. Hopkins and W. H. Manring. *Ceramic Industry,* v. 62, Feb. 1954, p. 72, 90.

**5985* The Drying of Tableware and Other Ceramic Goods by the Jet Drying Method.** W. Hancock. *Ceramics,* v. 5, Dec. 1953, p. 454-457.

Includes photographs, table.

**5986* Iron Spotted Glazes.** Harding Black. *Ceramics Monthly,* v. 2, Feb. 1954, p. 20, 28.

Discusses materials and techniques employed. Photographs.

**5987 Progress in Permeable Porous Ceramics.** Felix Singer. *Chemical Age,* v. 70, Jan. 9, 1954, p. 141-146.

Considers a field of ceramics where porosity is an essential feature of the ware. It is concerned with passage of fluids through ceramic pieces for various purposes. Developed for filtration since the beginning of the century, it now has wider applications. Photographs. 9 ref.

**5988* The Demands of the Carbonizing Industry on the Refractories and Allied Industries.** C. Edwards. *Claycraft,* v. 27, Jan. 1954, p. 181-182, 188.

Includes table. (To be continued.)

**5989* On Structure and Anomalous Interval in Glass. New Russian Research.** *Glass,* v. 31, Jan. 1954, p. 23-24.

Studies on anomalous structure and effect of cooling temperatures and rates are presented. Graphs. 6 ref.

## *Ceramics and Concrete*

**5990 Materials for High Temperature Service. IV.** Howard C. Cross. *Industrial Heating*, v. 21, Jan. 1954, p. 154, 156, 158, 160.

Ceramic materials with high melting points and their solution for high temperature strength are discussed. Tables.

**5991 Alumino-Silicate Refractories.** E. C. Shears and W. A. Archibald. *Iron & Steel*, v. 27, Jan. 1954, p. 26-30.

Outlines development of chemistry of alumino-silicates. Relationships among structures of andalusite, kyanite, sillimanite, and mullite are shown. Diagrams, tables. (To be continued.)

**5992 Refractory Types and Applications.** H. A. Robertson. *Iron and Steel Engineer*, v. 31, Jan. 1954, p. 86-89.

Selection of right refractories for varied steel plant applications requires good engineering judgment.

**5993* X-Ray Diffraction Studies in the System BeO-$In_2O_3$.** L. M. Watt and W. O. Milligan. *Journal of Physical Chemistry*, v. 57, Dec. 1953, p. 883-885.

Discusses experimental studies. Graphs. 8 ref.

**5994* The Thermal Transformations of the Aluminas and Their Hydrates.** M. K. B. Day and V. J. Hill. *Journal of Physical Chemistry*, v. 57, Dec. 1953, p. 946-950.

Discusses results of experimental determinations. Diagrams, tables, diffraction patterns. 8 ref.

**5995 Commercial Synthesis of Star Sapphires and Star Rubies.** Clifford Frondel. *Mining Engineering*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 199, Jan. 1954, p. 78-80.

Discusses demand. Describes process. Photographs, micrograph. 3 ref.

**5996 Properties of Foreign and Domestic Natural Graphites.** *National Bureau of Standards, Technical News Bulletin*, v. 38, Jan. 1954, p. 5-6.

Includes diagrams.

**5997 Adsorption of Helium on Glass at Temperatures Below the λ-Temperature.** (English.) H. H. Tjerkstra, F. J. Hooftman, and C. J. N. Van Den Meydenberg. *Physica*, v. 19, no. 10, Oct. 1953, p. 935-942.

Investigates adsorption of He on a glass surface. New differential gauge is described. Diagram, table, graph. 8 ref.

**5998* A Summary and Appraisal of Economic and Technical Factors in High Pressure Steam Curing.** Dale Cobb. *Pit and Quarry*, v. 46, Jan. 1954, p. 245-246, 249-250, 268.

A neglected phase of process in the concrete masonry industry is discussed. Photographs.

**5999* Processing of the White Variety of Polish Magnesite.** (Polish.) F. Nadachowski. *Prace Instytutow Ministerstwa Hutnictwa*, v. 5, no. 5, Sept.-Oct. 1953, p. 245-258.

Discusses effect of $SiO_2$ content, sintering additions on refractoriness under load, and their slag resistance. Tables, graphs, photographs. 9 ref.

**6000* Flame Spraying Ceramics.** Thomas A. Dickinson. *Products Finishing*, v. 18, Feb. 1954, p. 32, 34, 36.

Technique permits application of heat-resistant ceramic coatings on materials like Al, Mg, and Ti as well as iron and steel products. Photographs.

**6001 Optical Glass.** W. N. Wheat. *Research*, v. 7, Jan. 1954, p. 19-26.

Surveys historical background of optical glassmaking. Outlines principal steps in manufacturing sequence. Some results of recent researches are given. Graph, tables, photographs. 8 ref.

**6002* Bottoms of Thomas Converters. Laboratory Study.** (French.) R. Gregoire and A. Decker. *Revue universelle des mines*, v. 9, ser. 9, no. 12, Dec. 1953, p. 831-834.

Experiments were conducted to determine action of carbon in presence of slag in Bessemer process. Photographs, diagrams, table.

**6003* Producing Surface-Coated Lightweight Aggregate.** Walter B. Lenhart. *Rock Products*, v. 57, Jan. 1954, p. 143-146, 149.

Discusses shale calcined in four rotary kilns, with product treated for free lime removal to produce Basalite aggregate with unique properties. Photographs, table.

**6004* Prospective Chemistry of Cement and Concrete. IX. More About the Structure of Water and Its Effects on Silicates.** Nathan C. Rockwood. *Rock Products*, v. 57, Jan. 1954, p. 147-149.

Includes diagrams.

**6005* Methods of Industrial Control of Glass Grinding and Polishing Processes.** (Russian.) P. Ia. Bokin. *Steklo i Keramika*, v. 10, no. 10, Oct. 1953, p. 4-6.

Describes three automatic control methods tested under industrial conditions. Table, graph. 2 ref.

**6006* Composition of Selenium Ruby for Production of Red Light Filters on Vertical Glass Drawing Machines.** (Russian.) M. A. Tsaritsyn. *Steklo i Keramika*, v. 10, no. 10, Oct. 1953, p. 6-11.

Discusses problem of developing a standard glass composition so process can be mechanized and still retain required properties. Tables, graphs, diagram.

**6007* Raw Material for Production of Ceramic Ducts.** (Russian.) L. E. Krushel. *Steklo i Keramika*, v. 10, no. 10, Oct. 1953, p. 11-13.

Technical requirements and production techniques for ceramic water pipes are described. Table, graph.

**6008* Granulometric Classification and Selection of Clays for Production of Tile.** (Russian.) M. Z. Berlin. *Steklo i Keramika*, v. 10, no. 10, Oct. 1953, p. 13-16.

Relationship between grain size and physico-mechanical properties is discussed. Table, graph.

**6009* Argillites. A New Raw Material for Construction Industry.** (Russian.) A. S. Fefer and G. D. Sokolov. *Steklo i Keramika*, v. 10, no. 10, Oct. 1953, p. 21-23.

Discusses variation of composition. Describes application where other clays are limited. Photographs.

**6010* Stresses Occurring During the Drying Process Inside the Body of Cylindrical Ducts Made of Clay Slips.** (Russian.) P. O. Vasilevskii. *Steklo i Keramika*, v. 10, no. 10, Oct. 1953, p. 23-27.

Discusses phenomena of surface bubbles and internal cracks. Graphs, diagrams.

**6011* Cooling of the Clinkering Zone by the Installation of Ribs on the Surface of Rotating Furnace Shell.** (Russian.) D. Ia. Mazurov. *Tsement*, v. 19, no. 5, Sept.-Oct. 1953, p. 20-25.

Shows that ribbing assists in protection of fettling. Graphs, diagram.

**6012* Effect of Silica on the Hydration and Solubility of Vitreous Sodium Silicates.** (Russian.) M. A. Matveev. *Zhurnal Prikladnoi Khimii*, v. 26, no. 10, Oct. 1953, p. 1014-1019.

Greatest tendency for hydration was noted when silica component was low. Tables, graphs. 7 ref.

### *Books and Miscellaneous Publications*

**6013 Ceramics. A Symposium.** A. T. Green and Gerald H. Stewart, editors. 877 p. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Twenty-nine contributions individually abstracted, make up this symposium and are grouped according to their range of interest under four principal headings.

**6014 Geology and Ceramics.** P. S. Keeling. Paper from CERAMICS. A SYMPOSIUM. p. 1-14. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Brief review and properties of more important ceramic raw materials are given under headings of Pottery, Refractories, and Building Clay. 26 ref.

**6015 Structural Aspects of the Mineralogy of Clays and Related Silicates.** G. W. Brindley and D. M. C. MacEwan. Paper from CERAMICS. A SYMPOSIUM. p. 15-59. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Chemical aspects, particularly composition and cation exchange characteristics, morphology, and basic layer structures are discussed. Tables, graph, diagrams. 109 ref.

**6016 The Colloidal and Rheological Properties of Clay.** D. A. Holdridge. Paper from CERAMICS. A SYMPOSIUM. p. 60-93. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Discusses colloids in general. Particular case of clays is expanded. Graphs, diagrams, tables. 73 ref.

**6017 Phase Relationships in Ceramics.** James White. Paper from CERAMICS. A SYMPOSIUM. p. 94-162. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Nature and significance of equilibrium relationships in ceramic materials, *i.e.* those aspects of their behavior that are controlled by thermodynamic factors, are discussed. Graphs, tables. 59 ref.

**6018 X-Rays and Ceramics.** H. M. Richardson. Paper from CERAMICS. A SYMPOSIUM. p. 163-185 + 4 plates. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Conception of crystal lattice by studying structure of one or two silicates and examples of use of X-ray powder diffraction and back-reflection methods in studying ceramic problems is presented. Tables, graph, diagrams. 50 ref.

**6019 The Action of Heat on Clays.** J. F. Hyslop. Paper from CERAMICS. A SYMPOSIUM. p. 186-200. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Considers dehydration, recrystallization, and vitrification as a working basis for heat treatment of clays. Graphs, micrographs, table. 62 ref.

**6020 The Forms of Silica.** A. E. Dodd. Paper from CERAMICS. A SYMPOSIUM. p. 201-211. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Growth of knowledge of behavior of silica at temperatures up to its melting point and some uncertainties that the latest research has revealed are discussed. Graph, tables, diagrams. 44 ref.

**6021 Fifty Years of Progress in Ceramic Whitewares.** S. W. Ratcliffe and W. L. German. Paper from CERAMICS. A SYMPOSIUM. p. 212-226. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Progress of tableware in the whiteware industry. 69 ref.

**6022 The Composition and Properties of Electrical Ceramics.** E. C. Bloor. Paper from CERAMICS. A SYMPOSIUM. p. 227-283. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Discusses development of insulations for low and high voltages, frequencies, and temperatures for various applications. Graphs, tables. 211 ref.

**6023 The Structure of Glazes.** A. N. Smith. Paper from CERAMICS. A SYMPOSIUM. p. 284-302. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Composition of glazes using ideas of structural inorganic chemistry are discussed. Graphs, tables. 18 ref.

**6024 Saggars and Kiln Furniture.** R. P. White. Paper from CERAMICS. A SYMPOSIUM. p. 303-314. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Contemporary saggar-making practice and kiln furniture design are discussed. Table. 44 ref.

**6025 Changes in the Theory and Practice of Drying, 1900-1950.** C. E. L. Franklin. Paper from CERAMICS. A SYMPOSIUM. p. 315-362. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

History of development of methods for accelerated drying of greenware in the ceramic industry is presented. Diagrams, table, graphs. 202 ref.

**6026 The Development of Firing in the Pottery Industry.** A. Dinsdale. Paper from CERAMICS. A SYMPOSIUM. p. 363-397 + 4 plates. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

History of change and its cause and effect are traced. Suggestions are made concerning future trends in tunnel design. Tables, graphs, diagrams. Photographs. 68 ref.

**6027 Testing in the Pottery Industry.** D. G. Beech. Paper from CERAMICS. A SYMPOSIUM. p. 398-417. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Testing methods for prevention of manufacturing troubles are discussed. 70 ref.

**6028 Fireclay and Alumino-Silicate Refractories in the *20th* Century.** F. H. Clews. Paper from CERAMICS. A SYMPOSIUM. p. 418-447. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Discusses testing, chemical composition, texture, nad manufacturing methods of past and present. Micrographs, graphs, diagrams, photograph. 89 ref.

**6029 The Manufacture of Silica Bricks During the Last Fifty Years.** T. R. Lynam. Paper from CERAMICS. A SYMPOSIUM. p. 448-473. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Trends in the last 50 years are discussed. Photographs, photomicrographs, graphs, tables. 19 ref.

**6030 Raw Materials for the Manufacture of Basic Refractories.** A. E. Dodd. Paper from CERAMICS. A SYMPOSIUM. p. 474-487. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Nature, effect, and classification of dolomite, chromite, and magnesite are presented. 62 ref.

**6031 The Spinels and Their Relation to Chrome Ores.** G. R. Rigby. Paper from CERAMICS. A SYMPOSIUM. p. 488-512 + 1 plate. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Properties of spinels and chrome ores are discussed. Behavior under various conditions is presented. Tables, photomicrographs. 66 ref.

**6032 The Development of Chrome-Magnesite Bricks.** H. Parnham. Paper from CERAMICS. A SYMPOSIUM, p. 513-535. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Discussion on raw materials, classification, manufacture, and properties is presented. Tables, graphs, photographs, diagrams. 8 ref.

**6033 Super-Refractories.** W. A. Archibald and E. J. D. Smith. Paper from CERAMICS. A SYMPOSIUM. p. 536-591. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Methods of preparation and properties of materials are considered in relation to general conditions of service of the refractory. Tables, graphs, diagrams. 195 ref.

**6034 The Development of Insulating Bricks for Furnace Construction.** H. Oliver. Paper from CERAMICS. A SYMPOSIUM. p. 592-636. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Presents manufacturing methods, technology, and applications. Photograph, tables, graph, diagrams. 96 ref.

**6035 Progress in the Development of Refractories for Steel Manufacture.** J. H. Chesters. Paper from CERAMICS. A SYMPOSIUM. p. 637-650 + 4 plates. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Refractories of fireclay, silica, dolomite, magnesia, and chrome are discussed. Photographs. 18 ref.

## *Ceramics and Concrete*

**6036 Progress in the Development of Blast Furnace Refractories.** J. Mackenzie. Paper from CERAMICS. A SYMPOSIUM. p. 651-670 + 4 plates. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Physical and chemical changes in various types of furnaces are described. Diagrams, drawing, tables, photographs. 12 ref.

**6037 Refractories in the Gas Industry, 1900-1950.** J. Laming. Paper from CERAMICS. A SYMPOSIUM. p. 671-686. 1953. The British Ceramic Soicety, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Durability, refractories research, and retort design are discussed. Graph, table. 56 ref.

**6038 The Thermal Properties of Ceramic Products.** J. F. Clements. Paper from CERAMICS. A SYMPOSIUM. p. 687-725. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Nature of heat, measurement, data, and factors affecting properties are discussed. Tables, graphs, diagrams. 114 ref.

**6039 Testing Refractory Materials.** J. F. Clements. Paper from CERAMICS. A SYMPOSIUM. p. 726-737, 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Several methods used in testing of materials are described. Table. 51 ref.

**6040 The Heavy Clay Industry, 1900 to 1950.** W. Noble. Paper from CERAMICS. A SYMPOSIUM. p. 738-770. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Methods of winning, haulage, clay preparation, and drying are discussed. Drawings, tables. 112 ref.

**6041 Firing in the Heavy Clay and Refractories Industries, 1900-1950.** E. Rowden. Paper from CERAMICS. A SYMPOSIUM. p. 771-823. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Historical survey and trends in firing of various products is presented. Drawings, photograph, tables. 120 ref.

**6042 The Properties of Clay Building Materials.** B. Butterworth. Paper from CERAMICS. A SYMPOSIUM. p. 824-877. 1953. The British Ceramic Society, Stoke-on-Trent, Staffordshire, England. (TP807 C33)

Testing methods and desirable characteristics are discussed. 278 ref.

**6043* Clay Bibliography.** Subcommittee on Clay Bibliography, Research and Development Committee. 819 p. 1953. Bowling Green State Univ., Bowling Green, Ohio. (Z7914.C6 B68c)

**6044 The Effect of Surface Condition on the Strength of Brittle Materials.** C. Gurney. Paper from PROPERTIES OF METALLIC SURFACES, SYMPOSIUM. INSTITUTE OF METALS, MONOGRAPH AND REPORT SERIES 13. p. 145-160. 1953. Institute of Metals, London. (TS213 P94)

Strength of crystalline non-metallic material is very sensitive to surface defects. Strength of plastics and glass, except when drawn into fine fibers, is not nearly so dependent on mechanical perfection of the surface. Graphs. 28 ref.

***See also:***
**5851** (wings in prestressed concrete)
**6242** (use of refractory oxides)
**6372** (cement furnace mechanism control)
**6470** (cement demands in 1954)
**6480** (flow of molten glass)
**6519** (operation of open flame kilns)
**6548** (crystallography of aluminates and silicates)
**6549** (structure of kaolinites)
**6550** (minerology of kaolin)
**6646** (X-ray camera for ceramic research)
**6769** (effect of granulation on properties of slag sands)
**6782** (physical chemistry of melts)
**6783** (constitution of liquid slags)
**6785** (anomalies in surface tension of silicates)
**6835** (refractory lining for patching cupolas)
**7076** (X-ray application in ceramics)
**7210** (magnetic behavior of ferrites)

## CHEMICAL ENGINEERING

**6045* 50 Years of Progress in Chrome Tanning.** David B. Eisendrath. *American Leather Chemists' Association, Journal,* v. 49, Jan. 1954, p. 52-58.

**6046* Tall Oil Studies. II. Decolorization of Polythenoxy Tallates with Ozone and Hydrogen Peroxide.** J. V. Karabinos and A. T. Ballun. *American Oil Chemists' Society, Journal,* v. 31, Feb. 1954, p. 71-74.

Presents results of experimental studies. Tables, graphs. 4 ref.

**6047* Counter-Current Adsorption Separation Processes. II. Shell Adsorbents.** D. E. Weiss. **III. The Adhesion of Wet Quartz and Diatomaceous Earth.** D. W. Minty, M. Ross, and D. E. Weiss. **IV. Batch Method of Fractionation.** D. W. Minty, R. McNeil, M. Ross, E. A. Swinton, and D. E. Weiss. **V. Froth-Flotation in Columbns.** G. Moir, M. Ross, and D. E. Weiss. *Australian Journal of Applied Science,* v. 4, Dec. 1953, p. 510-551.

Includes graphs, diagrams. 21 ref.

**6048 Control and Segregation in Dry Grinding.** Dwight B. Hendryx. *Brick & Clay Record,* v. 124, Jan. 1954, p. 45-46, 89, 107.

Presentation of a study on jaw, gyratory, and single roll crushers, including problem of hammer mill vs. dry pan. Photograph.

**6049 The Manufacture of Non-Ionic Synthetic Detergents.** *Canadian Chemical Processing,* v. 38, Jan. 1954, p. 42, 44.

Method of alkylating phenol and condensing the alkylate with ethylene oxide is discussed. Photographs.

**6050* The Status of Coal Cleaning in Western Canada.** J. Visman. *Canadian Mining and Metallurgical Bulletin,* v. 47, no. 501, Jan. 1954, p. 15-23; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 57, 1954, p. 13-21.

Presents outline of market factors and trends in coal industry of Western Canada. Describes several systems of coal cleaning and various types of washers now in use. Tables, graphs. 13 ref.

**6051* Industrial Minerals in the Chemical Industry.** J. R. Donald. *Canadian Mining and Metallurgical Bulletin,* v. 47, no. 501, Jan. 1954, p. 24-26; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 57, 1954, p. 22-24.

Minerals and applications to chemical industry.

**6052 Anhydrous NaOH; Today's Technology.** W. L. Badger and F. C. Standiford. *Chemical Engineering,* v. 61, Feb. 1954, p. 183-187.

Continuous finishing of caustic in Dowtherm-heated evaporators is superseding batch finishing in direct-fired pots. Photograph, diagrams.

**6053 Chemical Engineering Fundamentals. III. Compression and Expansion.** Thomas E. Corrigan and A. F. Johnson. *Chemical Engineering,* v. 61, Feb. 1954, p. 212, 214, 216, 220, 222.

A review of some engineering princpiles.

**6054 How to Get Pure Isopropanol.** *Chemical Engineering,* v. 61, Feb. 1954, p. 262, 264.

Method of high pressure distillation is discussed. Diagrams,

**6055 Kinetics of the Catalytic Cracking of Alkylbenzenes.** H. F. Rase and R. S. Kirk. *Chemical Engineering Progress,* v. 50, Jan. 1954, p. 35-44; disc., p. 44.

Discusses results of investigation to determine quantitatively the effect of molecular structure on rate of catalytic cracking of *mono*-alkylbenzenes over silica-alumina catalyst. Diagram, graphs, tables. 28 ref.

**6056 Ion Exclusion—Column Analysis.** D. W. Simpson and R. M. Wheaton. *Chemical Engineering Progress*, v. 50, Jan. 1954, p. 45-49.

Discusses method of separating ionic and non-ionic components of a solution by use of ion-exchange resins. Graphs, diagram. 7 ref.

**6057* From Ethyl Alcohol to Cellulose Acetate.** *Chemical & Process Engineering*, v. 35, Jan. 1954, p. 5-9, 19.

Australia's new chemical industry starts process from basic raw material (ethyl alcohol) and continues through acetic acid and acetic anhydride to final cellulose acetate flake. Photographs, diagrams.

**6058* Chemical Engineering Review: Heat Transfer.** J. Moss. *Chemical & Process Engineering*, v. 35, Jan. 1954, p. 10-13, 20.

Covers recuperation, regeneration, fixed beds, transpiration, cooling, fluidized beds, boiling evaporation, condensation, and radiation. 116 ref.

**6059 Performance of Low-Finned Tubing in Hydrocarbon Condensing Service.** G. W. Ames and R. G. Newell. *Chemistry in Canada*, v. 6, Jan. 1954, p. 23-27.

Describes application and concludes that the above prove economical when correctly installed in non-fouling media. Photographs, tables, diagrams. 10 ref.

**6060 Potatoes as a Crop and an Industrial Raw Material. Potato as an Industrial Raw Material.** J. A. Radley. *Chemistry & Industry*, 1954, no. 3, Jan. 16, p. 64-68.

Discusses industrial use of potatoes in manufacture of food products; ethyl alcohol and other fermentation products; starch; glucose; dextrins; and derivatives of starch. 61 ref.

**6061* Study on the Process of Phase Separation of the Graphite-Mineral-Water-Oil System.** (German.) E. Weingaertner and T. K. Ghose. *Erdöl und Kohle*, v. 6, no. 12, Dec. 1953, p. 776-783.

Laws governing Trent process of separating two or more solids by using their differential "wetting affinities" for two immiscible liquid phases. Tables, graphs, photographs. 9 ref.

**6062 Structural Aspects of Cooling Tower Selection.** M. E. O'K. Trowbridge and A. J. Hayter. *Industrial Chemist and Chemical Manufacturer*, v. 30, Jan. 1954, p. 15-21.

Structural design of mechanical draft cooling towers is discussed. Emphasizes its importance as compared with that of the initial cost of equipment. Diagrams, photographs.

**6063 Ethyl and *Iso*propyl Benzene, Keystones of the Petrochemical Industry.** Peter W. Sherwood. *Industrial Chemist and Chemical Manufacturer*, v. 30, Jan. 1954, p. 25-28.

Discusses economic importance of ethyl benzene and isopropyl benzene for the production of styrene and phenol respectively. Describes modern methods for preparing the two former compounds. Diagram, photographs. (To be continued.)

**6064* Autofining. A New Process for Catalytic Desulphurization.** F. W. B. Porter. *Institute of Petroleum, Journal*, v. 40, Jan. 1954, p. 18-30; disc., p. 30-31.

Process embodies feature that H required for elimination of S as $H_2S$ is provided by dehydrogenation of compounds present in the feed-stock. Diagrams, graphs, tables, photographs. 3 ref.

**6065* Tests on Calf and Kip Skins Show No Effect on Salt and Protein Removal.** A. W. Goetz and H. A. Alps. *Leather and Shoes*, v. 127, Jan. 23, 1954, p. 19-20.

Tanners urged to investigate green fleshing or lime fleshing for their type of leather production. Tables.

**6066* Engineering Problems of Antibiotics Manufacture.** J. J. H. Hastings. *Manufacturing Chemist*, v. 25, Jan. 1954, p. 17-18.

Abridged from "Problems of Biochemical Engineering", read before Inst. of Chemical Engineers, London Dec. 1953. Discusses sterile practices, including treatment of air, materials, plant, and equipment.

**6067* The Development of a Magnetic Roller-Type Filter.** William A. Colburn. *Mines Magazine*, v. 44, Jan. 1954, p. 29-33.

Studies were made of nature of material to be filtered and of behavior of material when it is under influence of a magnetic field. Diagrams, photographs, table.

**6068 Hypothesis for Different Floatabilities of Coals, Carbons, and Hydrocarbon Minerals.** Shiou-Chuan Sun. *Mining Engineering*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 199, Jan. 1954, p. 67-75.

Includes graphs, tables, diagrams. 23 ref.

**6069 Automatic Sampling of Hydrocarbons.** W. E. Gibson. *Oil and Gas Journal*, v. 52, Feb. 1, 1954, p. 68-69.

Describes an automatic sampling device that operates in direct proportion to flow. Diagrams.

**6070 How to Design and Evaluate Absorbers. XI.** R. J. Hull and K. Raymond. *Oil and Gas Journal*, v. 52, Feb. 1, 1954, p. 95-96.

Includes table, graph.

**6071 Synthesis of Petrochemicals. VI. Successful Acetylene Synthesis.** Richard Sneddon. *Petroleum Engineer*, v. 26, Jan. 1954, p. C5-C8.

Petrochemical industry may derive its future supply of acetylene from decomposition of light hydrocarbons. Diagram, photographs, tables.

**6072 Trends in Refinery Instrumentation. XII. Pneumatic Control.** W. C. Longstreth. *Petroleum Engineer*, v. 26, Jan. 1954, p. C16, C18, C21-C22, C24.

Proper maintenance, repair, and replacement of air supply and control equipment is insurance of long instrument life and accurate control. Photographs, diagrams.

**6073 Development of Petroleum and Petrochemical Processing. I. Renaissance of Petroleum Processing.** Benjamin T. Brooks. *Petroleum Engineer*, v. 26, Jan. 1954, p. C25-C26, C28-C29.

Discusses developments from early inaccurate methods to present-day, orderly, systematic techniques. 9 ref.

**6074 How Chemical Cleaning Makes Money.** J. T. Browning. *Petroleum Refiner*, v. 33, Feb. 1954, p. 131-132.

Case history of profitable application of chemical cleaning to restoration and cleaning of entire section of a refinery. Photographs, diagram.

**6075* Chemical Studies on the Liming of Animal Skin. III. Sulfur Compounds Produced in Lime Liquor. IV. Depilatory Action of Dimethylamine. V. Action of Dimethylamine on Hide and Hair.** (Japanese.) Harukazu Toyoda. *Reports of the Government Chemical Industrial Research Institute, Tokyo*, v. 48, no. 8, Oct. 1953, p. 277-306.

Conclusions are presented in English. Tables, graphs. 28 ref.

**6076 Preparation Characteristics of Anthracites in South Korea.** W. L. Crentz. *U. S. Bureau of Mines, Report of Investigations* 5010, Dec. 1953, 17 p. + 4 plates. (TN21 UN3r)

Includes tables, map, photographs.

*Books and Miscellaneous Publications*

**6077* The Handbook of Solvents.** Leopold Scheflan and Morris B. Jacobs. 728 p. 1953. D. Van Nostrand Co., New York. (TP247.5 Sch24h)

Various theoretical aspects and practical attributes of solvents such as solvent action power; evaporation and evaporation rates; and limits of inflammability. Subject of solvent recovery is discussed and annotated with many literature references. Physical constants of more than 2700 liquid organic compounds are tabulated.

***See also:***

**5906** (manufacture of anhydrous ammonia)
**5978** (electrical heating of screen meshes)
**6792** (principles of particle size measurement)
**6793** (technique of particle size analysis)
**6795** (theory of communication)

*Chemical Engineering*

**6796** (grinding efficiency of industrial equipment)
**6799** (development in particle dynamics)
**6800** (motion of solid particles in a hydraulic cyclone)
**6801** (heavy media separation process)
**6802** (explanation and application of the hydrocyclone)
**6808** (principles and properties of plate-type separator)
**6812** (surface chemistry of flotation)
**6813** (characteristics of flotation frothers)
**6814** (process of bubble-mineral attachment)
**6816** (electrochemical method in flotation research)
**7103** (mineral dressing in diamond mining)
**7104** (preparation and grading of chrysotile asbestos)
**7111** (ultrasonics in chemical processing)
**7341** (gelatins and animal glues)
**7377** (drying rates in paper machines)

## CHEMISTRY—ANALYTICAL AND INORGANIC

**6078 Micro-Analysis of Silicate Rocks. IV. The Determination of Alumina.** Christina C. Miller and Robert A. Chalmers. *Analyst*, v. 78, Dec. 1953, p. 686-694; disc., p. 694.

Includes diagrams, graphs, table. 15 ref.

**6079 The Spectrophotometric Determination of Long-Chain Fatty Acids Containing Ketonic Groups With Particular Reference to Licanic Acid.** A. Mendelowitz and J. P. Riley. *Analyst*, v. 78, Dec. 1953, p. 704-709.

Includes tables, graph. 25 ref.

**6080 The Determination of Small Amounts of Potassium, Calcium and Magnesium in Sodium and Its Compounds.** Louis Silverman and K. Trego. *Analyst*, v. 78, Dec. 1953, p. 717-721.

Includes tables. 11 ref.

**6081 6th Annual Review of Analytical Chemistry.** *Analytical Chemistry*, v. 26, Jan. 1954, p. 2-176.

Includes "Light Absorption Spectrometry", M. G. Mellon; "Infrared Spectroscopy", R. C. Gore; "Ultraviolet Absorption Spectrophotometry", E. J. Rosenbaum; "X-Ray Absorption and Emission", H. A. Liebhafsky; "X-Ray Diffraction", H. S. Kaufman and Isidor Frankuchen; "Electron Microscopy", Max Swerdlow; "Chemical Microscopy", W. C. McCrone; "Raman Spectroscopy", R. F. Stamm; "Emission Spectroscopy", W. F. Meggers; "Mass Spectrometry", V. H. Dibeler; "Organic Polarography", Stanley Wawzonek; "Acid-Base Titrations in Nonaqueous Solvents", J. A. Riddick; "Potentiometric Titrations", N. H. Furman; "Chromatography", H. H. Strain, T. R. Sato, and John Engelke; "Distillation Analysis", Arthur and Elizabeth Rose; "Ion Exchange", Robert Kunin and F. X. McGarvey; "Extraction", Lyman Craig; "Organic Microchemistry", C. L. Ogg; "Inorganic Microchemistry", P. W. West; "Fluorometric Analysis", C. E. White; "Electroanalysis", D. D. DeFord; "Inorganic Gravimetric Analysis", F. E. Beamish and W. A. E. McBryde; "Volumetric Analytical Methods for Organic Compounds", W. T. Smith, Jr., W. F. Wagner, and J. M. Patterson; "Biochemical Analysis", P. L. Kirk and E. L. Duggan; and "Nucleonics", C. L. Gordon. Tables, diagrams. 6442 ref.

**6082 Literature Problems in Analytical Photometry.** M. G. Mellon. *Analytical Chemistry*, v. 26, Jan. 1954, p. 181-185.

Outlines problems encountered during literature searches. Lists publications found to be most fruitful. Tables. 53 ref.

**6083 Kjeldahl Method for Organic Nitrogen.** R. B. Bradstreet. *Analytical Chemistry*, v. 26, Jan. 1954, p. 185-187.

Discusses apparatus, reagents, and procedures. Table. 73 ref.

**6084 Use of Infrared Radiation for Detection of Colorless Substances on Paper Chromatograms.** Donald R. Kalkwarf and Arthur A. Frost. *Analytical Chemistry*, v. 26, Jan. 1954, p. 191-195.

Includes diagrams, graphs. 16 ref.

**6085 Spectrophotometric Titrations With Ethylenediaminetetraacetic Acid. II.** Philip B. Sweetser and Clark E. Bricker. *Analytical Chemistry*, v. 26, Jan. 1954, p. 195-199.

Discusses determination of Mg, Ca, Zn, Cd, Ti, and Zr. Graphs, tables. 6 ref.

**6086 Spectrophotometric Determination of Iron in Vanadium, Chromium, Manganese, Nickel, and Zinc.** D. W. Margerum and Charles V. Banks. *Analytical Chemistry*, v. 26, Jan. 1954, p. 200-202.

Includes tables. 17 ref.

**6087 Spectrographic Analysis of Minor Elements Extracted From Plants and Soils as Dithizonates.** W. J. Wark. *Analytical Chemistry*, v. 26, Jan. 1954, p. 203-205.

Includes tables, graph. 3 ref.

**6088 Extraction and Recovery of Thiols From Petroleum Distillates.** Ralph L. Hopkins and H. M. Smith. *Analytical Chemistry*, v. 26, Jan. 1954, p. 206-207.

Describes qualitative testing and quantitative application of method for thiols (mercaptan) using sodium aminoethoxide in ethylenediamine solution. Tables, diagram. 3 ref.

**6089 Determination of Oxygen in Sodium.** J. C. White, W. J. Ross, and Robert Rowan, Jr. *Analytical Chemistry*, v. 26, Jan. 1954, p. 210-213.

Includes tables. 6 ref.

**6090 Gravimetric Determination of Tetramethylphosphonium Ion.** C. J. Anderson and R. A. Keller. *Analytical Chemistry*, v. 26, Jan. 1954, p. 213-214.

Use of chloroplatinic acid as precipitant. Tables. 3 ref.

**6091 Potentiometric Differentiation of Certain Inorganic Cations.** Charles W. Pifer, Ernest G. Woolish, and Morton Schmall. *Analytical Chemistry*, v. 26, Jan. 1954, p. 215-217.

Includes graphs. 4 ref.

**6092 Improved Micro-Dumas Method and Apparatus.** Thomas D. Parks, Edwin L. Bastin, Eligio J. Agazzi, and Francis R. Brooks. *Analytical Chemistry*, v. 26, Jan. 1954, p. 229-232.

Describes reliable, routine method for determination of nitrogen. Photographs, diagrams, table. 14 ref.

**6093 Quantitative Determination of S-35-Labeled Compounds in Complex Mixtures.** Jacklyn B. Melchior and Arthur H. Goldkamp. *Analytical Chemistry*, v. 26, Jan. 1954, p. 233-235.

Includes graphs, tables. 7 ref.

**6094 Simplified Apparatus for Quantitative Hydrogenation.** Richard L. Parrette. *Analytical Chemistry*, v. 26, Jan. 1954, p. 237-239.

Includes diagrams. 8 ref.

**6095 Mechanism of High-Frequency Titration.** Shizuo Fujiwara and Schoichi Hayashi. *Analytical Chemistry*, v. 26, Jan. 1954, p. 239-241.

Theoretical study. Diagrams, graphs. 20 ref.

**6096 Assay of Radioiron and Radiosilver in Biological Samples.** Loretta Cheong, Giulio C. Perri, and L. M. Sharpe. *Analytical Chemistry*, v. 26, Jan. 1954, p. 242-243.

Includes tables. 7 ref.

**6097 Addition Agents in Analytical Precipitations.** Robert B. Fischer and T. Ben Rhinehammer. *Analytical Chemistry*, v. 26, Jan. 1954, p. 244-246.

Includes tables. 5 ref.

**6098 Determination of Sodium Monoxide in Sodium. Addendum.** Leonard P. Pepkowitz, William C. Judd, and Raymond J. Downer. *Analytical Chemistry*, v. 26, Jan. 1954, p. 246.

Includes table. 5 ref.

**6099 Determination of Columbium in the Presence of Titanium.** V. S. Syrokomskii and N. G. Klimenko. *Henry Brutcher, Altadena, Cal., Translation* no. 3022, 8 p. + 1 plate. (From *Zavodskaya Laboratoriya*, v. 13, no. 9, 1947, p. 1035-1038.)

Describes difficulties encountered in separation of Cb from Ti, analysis procedure, and advantages of method. Tables, graphs. 2 ref.

**6100 Ultramicrochemistry.** (French.) P. J. Gillis. *Bulletin de la société chimique de France*, 1953, nos. 11-12, Nov.-Dec., p. C91-C94.

Objectives and practical uses are described. 30 ref.

**6101* Detection and Determination of Carbon in Steel by the Use of Artificial Radioactivity.** (French.) Irene Curie. *Bulletin de la société chimique de France*, 1953, nos. 11-12, Nov.-Dec., p. C94-C97.

Discusses auto radiography studies which may enable a quantitative study of carburizing or segregation of C. X-ray photographs, graphs.

**6102* Microcalculation by Chemical Method of Carbon in Iron Irradiated by Deutons.** (French.) Ph. Albert, G. Chaudron, and P. Süe. *Bulletin de la société chimique de France*, 1953, nos. 11-12, Nov.-Dec., p. C97-C102.

Discusses chemical separation of radio-nitrogen. Tables, graphs, diagram. 6 ref.

**6103* Determination of Manganese, Sodium, and Uranium by Radioelements.** (French.) C. Fisher and J. Beydon. *Bulletin de la société chimique de France*, 1953, nos. 11-12, Nov.-Dec., p. C102-C103.

**6104* Microdetermination of Impurities in Precipitates by the Use of Radioisotopes.** (French.) P. Daudel, R. Muxart, and R. Melet. *Bulletin de la société chimique de France*, 1953, nos. 11-12, Nov.-Dec., p. C104-C105.

Includes table, graphs.

**6105 Paper Chromatography—Its Principles and Uses.** Herbert Weil. *Canadian Chemical Processing*, v. 38, Jan. 1954, p. 68, 70, 72.

Use of chromatographic processing on paper is discussed. 33 ref.

**6106 Developments in the Use of Primary Standards & Indicators.** A. J. Nutten. *Chemical Age*, v. 70, Jan. 9, 1954, p. 123-129.

Survey covers some recent investigations. 33 ref.

**6107 Analytical Chemistry of W & Mo. I.** *Chemical Age*, v. 70, Jan. 23, 1954, p. 267-274.

Includes tables. 13 ref. (To be continued.)

**6108* The Chemistry of Bivalent Germanium Compounds. IV. Formation of Germanous Salts by Reduction by Hypophosphorus Acid.** D. A. Everest. *Chemical Society, Journal*, 1953, Dec., p. 4117-4120.

Includes tables. 9 ref.

**6109* Infrared Spectrum of Aneurin in a Free Base or Salt State, Deuteration Effect.** (French.) Henri Lenormant and Christiane de Lozé. *Comptes rendus*, v. 237, no. 23, Dec. 9, 1953, p. 1505-1507.

Shows that transformation of $NH_2$ in $NH_3^+$ cause differences between spectra of bichlorohydrate and of the base in the range of short wave lengths. Graph.

**6110* The Oxidizing Action of Pentavalent Vanadium on Certain Oxygenated Functions of the Acyclic Series.** (French.) André Morette and Ghislain Gaudefroy. *Comptes rendus*, v. 237, no. 23, Dec. 9, 1953, p. 1523-1525.

Aliphatic acids are not oxidizable by a vanadium solution except when there is a branched chain or a double bond. 7 ref.

**6111 Mercury-Cathode Electrolysis and Its Application to Steel Analysis. Methods Analysis Committee.** *Iron and Steel Institute, Journal*, v. 176, Jan. 1954, p. 29-36.

Method is described for Hg-cathode electrolysis applicable over a wide range of alloy compositions. Gives optimum conditions for removal of large amounts of cathodically deposited elements. Diagrams, tables, graph.

**6112 Absorptiometric Determination of Cobalt in Iron and Steel. Methods of Analysis Committee.** *Iron and Steel Institute, Journal*, v. 176, Jan. 1954, p. 63-66.

Boiling period to destroy interfering ions in eliminated. Reagent additions are adjusted to compensate for presence of certain alloying elements. Tables, graph.

**6113* Kinetics of the Reactions Between Iron (II) and Some Hydroperoxides Based Upon Cumene and Cyclohexane.** R. J. Orr and H. Leverne Williams. *Journal of Physical Chemistry*, v. 57, Dec. 1953, p. 925-931.

Discusses results of experimental studies. Tables, graphs. 30 ref.

**6114 Determination of Glucose by Means of Sodium Chlorite.** Herbert F. Launer, William K. Wilson, and Joseph H. Flynn. *Journal of Research, National Bureau of Standards*, v. 51, Nov. 1953, p. 237-245.

Oxidation of several aldoses with acid sodium chlorite solution was investigated. Graphs, tables. 29 ref.

**6115 The Colorimetric Determination of Zinc in Effluents.** R. F. Muraca, D. G. Gardner, and E. J. Serfass. *Plating*, v. 41, Feb. 1954, p. 155-156, 161-163.

Describes apparatus and procedure. Tables. 7 ref.

**6116* Magnetism and Inorganic Chemistry.** R. S. Nyholm. *Quarterly Reviews*, v. 7, no. 4, 1953, p. 377-406.

Discussion on valency, bond type, and stereo-chemistry of an atom with its effective magnetic moment. Tables, diagrams, graph. 138 ref.

**6117* Methods for the Preparation and Analysis of Samples of Very High Purity Iron.** (French.) J. Talbot, Albert M. Caron, and G. Chaudron. *Revue de métallurgie*, v. 50, no. 12, Dec. 1953, p. 817-826; disc., p. 827-828.

Non-metallic impurities were determined by micro-analysis. Metallic impurities were determined by irradiation. Properties of high purity Fe were studied. Micrograph, diagram, tables, graph, photographs. 8 ref.

**6118* Circular Paper Chromatography. II. Isatin as a Color Reagent for Amino Acids.** Abraham Saifer and Irwin Oreskes. *Science*, v. 119, Jan. 22, 1954, p. 124-125.

Discusses experimental studies. 18 ref.

**6119* Contribution to the Chemistry of Ferrous Metallurgy (1st Half Year of 1952).** (German.) Paul Klinger. *Stahl und Eisen*, v. 73, no. 25, Dec. 3, 1953, p. 1665-1668; no. 26, Dec. 17, 1953, p. 1737-1741.

Presents a literature review. Discusses methods of qualitative and quantitative analysis of ores, slags, pig iron, steels, and iron content in non-ferrous metals and alloys. Tables. 66 ref.

**6120* The Quantitative Determination of Gallium in Aluminum and Zinc With the Acid of Cupferron.** (German.) Ekkehard Gastinger. *Zeitschrift für analytische Chemie*, v. 140, no. 4, 1953, p. 244-251.

Experiments for precipitation of Ga. Tables. 7 ref.

**6121* Applying the Developmental Method to the Determination of Sulfur in Chromium and Iron-Chromium Alloys.** O. Horak. *Zeitschrift für analytische Chemie*, v. 140, no. 4, 1953, p. 255-261.

Describes rapid and accurate method. Tables. 11 ref.

**6122* Use of Ion Exchangers in Analytical Chemistry. XXVII. Separation of Metals With Ion Exchangers in Citrate Form.** (German.) Olof Samuelson, Lennart Lundén, and Kerstin Schramm. *Zeitschrift für analytische Chemie*, v. 140, no. 5, 1953, p. 330-335.

Experimental procedure and results. Tables. 2 ref.

**6123* Spectrometric Determination of Potassium With Dipicryl Amine.** (German.) Ekkehard Gastinger. *Zeitschrift für analytische Chemie*, v. 140, no. 5, 1953, p. 335-342.

Process is based on slight solubility of resulting K salts. Graphs, tables. 10 ref.

**6124* Separation of Arsenic-Antimony-Tin With Thioform Amide.** (German.) A. Musil, E. Gagliardi, and K. Reischl. *Zeitschrift für analytische Chemie*, v. 140, no. 5, 1953, p. 342-349.

Includes tables. 11 ref.

**6125* Separating Iron From Aluminum With Diethyl Ether and Tetrahydrofuran.** (German.) Hermann Specker

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and Heinrich Hartkamp. *Zeitschrift für analytische Chemie*, v. 140, no. 5, 1953, p. 353-355.

Disturbing effect of trivalent Fe on spectrophotometric determinations of small amounts of Al was corrected by proposed method. Table. 6 ref.

*Books and Miscellaneous Publications*

**6126 Experimental Inorganic Chemistry. A Guide to Laboratory Practice.** R. E. Dodd and P. L. Robinson. 424 p. 1954. Elsevier Publishing Co. (QD261 D66e)

General basic techniques; handling of gases; vacuum technique; preparation and purification of gases and volatile compounds; water, alkalis, acids, and solvents; colloids and disperse systems; physical methods; and literature, presentation, and safety.

**6127 Comprehensive Inorganic Chemistry. v. I. Principles of Atomic and Molecular Structure.** W. N. Lipscomb. **Theoretical and Applied Nuclear Chemistry.** P. R. O'Conner. **The Actinide Series.** G. T. Seaborg. 232 p. 1953. D van Nostrand Co., Inc., New York. (QD151 C73)

Volume I of an 11 volume reference work on chemical elements and their inorganic compounds. It is comprehensive in the extensiveness of the fields covered rather than in the fullness of their treatment.

***See also:***
**7125** (chromatography of radio-elements)

## CHEMISTRY—ORGANIC

**6128* Studies Related to Naturally Occurring Acetylene Compounds. XI. Further Investigations on the Composition of Essential Oils From the Genus *Erigeron*.** (English.) Gjertrud Moen Tronvold, Magne Nestvold, Dagny Holme, Jörgine Stene Sörensen, and Nils Andreas Sörenson. *Acta Chemica Scandinavica*, v. 7, no. 10, 1953, p. 1375-1387.

Essential oils from 27 species of *Erigeron* were studied. Only one species showed matricarianol in the fleabane oils. Tables. 11 ref.

**6129 Chain Transfer in the Polymerization of Styrene. VIII. Chain Transfer With Bromobenzene and Mechanism of Thermal Initiation.** Frank R. Mayo. *American Chemical Society, Journal*, v. 75, Dec. 20, 1953, p. 6133-6141.

Polymerization studies were made at 60, 155, and 176 C to produce polystyrenes by two different reactions. Tables, graph. 49 ref.

**6130 Low Temperature Autoxidation of Hydrocarbons. The Kinetics of Tetralin Oxidation.** Arthur E. Woodward and Robert B. Mesrobian. *American Chemical Society, Journal*, v. 75, Dec. 20, 1953, p. 6189-6195.

A study of reactions initiated thermally, by free radical propagators (benzoyl peroxide and azobisisobutyronitrile), and by cobaltous acetate. Tables, graphs. 24 ref.

**6131 On the Thermal Dissociation of Organic Compounds. V. The Effect of the Solvent (Fatty Acids) on the Thermal Dissociation of Urea.** Teruaki Mukaiyama and Takao Matsunaga. *American Chemical Society, Journal*, v. 75, Dec. 20, 1953, p. 6209-6212.

Above was studied by rate of $CO_2$ evolution. Graphs, tables. 10 ref.

**6132 Addition of Formic Acid to Olefinic Compounds. I. Monoölefinic Compounds.** H. B. Knight, R. E. Koos, and Daniel Swern. *American Chemical Society, Journal*, v. 75, Dec. 20, 1953, p. 6212-6215.

Reactions with oleic, elaidic, undecylenic acids, esters, alcohols, and hydrocarbons are studied. Some catalysts are evaluated. Tables. 9 ref.

**6133 Aromatic Esters of Fluorocarbon Acids.** Reginald F. Clark and J. H. Simons. *American Chemical Society, Journal*, v. 75, Dec. 20, 1953, p. 6305-6306.

Describes alcohol plus acid anhydride process of obtaining the above in a 95% yield. Tables. 2 ref.

**6134 Behavior of an Ion-Exchange Resin in Liquid Ammonia.** C. W. Keenan and W. J. McDowell. *American Chemical Society, Journal*, v. 75, Dec. 20, 1953, p. 6348.

Shows "Dowex-50" has the same qualities in liquid $NH_3$ as in water.

**6135 Aromatic Electrophilic Substitution by Hydrogen. III. The Mechanism of the Acid-Catalyzed Decarboxylation of Aromatic Aldehydes.** W. M. Schubert and Roland E. Zahler. **IV. The Mechanism of the Acid-Catalyzed Decarboxylation of Aromatic Acids.** W. H. Schubert, Jere Donohue, and D. J. Gardner. *American Chemical Society, Journal*, v. 76, Jan. 5, 1954, p. 1-4.

Rate, activation energy, and activation entropy data are interpreted in terms of proposed reaction mechanisms and structure of the aldehydes. Graphs, tables. 28 ref.

**6136 Amides of Ethylenediamines. II. Substituted Cinnamides as Local Anesthetic Agents.** Frank J. Villani, Joseph Lang, and Domenick Papa. *American Chemical Society, Journal*, v. 76, Jan. 5, 1954, p. 87-88.

Several cinnamides of substituted ethylenediamines were prepared and evaluated for their local anesthetic action. Table. 5 ref.

**6137 The Reactions of Dinitriles and Their Derivatives With Formaldehyde.** Henry Feuer and Stanley M. Pier. *American Chemical Society, Journal*, v. 76, Jan. 5, 1954, p. 105-107.

Acid-catalyzed reaction with dinitriles to produce polyamides and effect of centers of decreasing basicity in the nitrile were studied. 15 ref.

**6138 Hydantoins From Alicyclic Ketones and Aldehydes.** Edward S. Rothman and Allan R. Day. *American Chemical Society, Journal*, v. 76, Jan. 5, 1954, p. 111-113.

A series of new hydantoins have been synthesized. 19 ref.

**6139 Synthesis and Fungistatic Activity of Some 5-(1-Methyl-2-Thioalkylethylidene)-Rhodanines.** Charles K. Bradsher, Frances C. Brown, and R. Jack Grantham. *American Chemical Society, Journal*, v. 76, Jan. 5, 1954, p. 114-115.

Fungistatic action of new rhodanine compounds II are discussed. Graph, tables. 9 ref.

**6140 Poly-*p*-Amino-DL-Phenylalanine.** Michael Sela and Ephraim Katchalski. *American Chemical Society, Journal*, v. 76, Jan. 5, 1954, p. 129-133.

This polymer may serve as a representative of weekly basic poly-α-amino acids as well as a starting material for preparation of polypeptidic azo dyes. Graphs. 20 ref.

**6141 The Syntheses, Paper Chromatography and Substrate Specificity for Tyrosinase of 2,3-, 2,4-, 2,5-, 2,6- and 3,5-Dihydroxyphenylalanines.** John P. Lombooy. *American Chemical Society, Journal*, v. 76, Jan. 5, 1954, p. 133-138.

Amino acids have been synthesized from a variety of intermediates prepared by the Erlenmeyer reaction on the appropriate dihydroxy- or dimenthoxybenzaldehydes. Table. 19 ref.

**6142 Preparation and Properties of Serum and Plasma Proteins. XXXIX. The Interaction of Human Serum Albumin With Plumbous Ions.** F. R. N. Gurd and C. R. Murray, Jr. *American Chemical Society, Journal*, v. 76, Jan. 5, 1954, p. 187-190.

Interaction with plumbous ion at O C has been studied in terms of effect of metal on solubility of protein and in terms of binding. Tables. 18 ref.

**6143* Studies on the Effects of Surface-Active Agents on the Extraction of Crude Drugs.** Einar Brochmann-Hanssen. *American Pharmaceutical Association, Journal, (Scientific Ed.)*, v. 43, Jan. 1954, p. 27-31.

Experiments were made to evaluate fundamental aspects of various types of surface-active agents with a variety of structural differences, selected from anionic, cationic, and nonionic groups, on extraction of crude drugs. Tables, graphs.

**6144 Chemical Action of X-Ray on Nucleic Acids and Related Substances in Aqueous Systems. II. The Mechanism of the Action of X-Ray on Nucleic Acids in Aqueous**

**Systems.** G. Scholes and J. Weiss. *Biochemical Journal*, v. 56, Jan. 1954, p. 65-72.

Detailed results are presented. Mechanism of degradation induced by X-rays in polynucleotides is discussed. Graphs, table. 24 ref.

**6145 Synthesis of Organic Deuterium Compounds. X. Methyl-$d_3$ Iodide and Deuterium Substitution Products of Methyl Acetate.** B. Nolin. *Canadian Journal of Chemistry*, v. 32, Jan. 1954, p. 1-3.

Presents experimental method. Table. 6 ref.

**6146 Sulphur Isotope Effects in the Bisulphite Addition Reaction of Aldehydes and Ketones. I. Equilibrium Effect and the Structure of the Addition Product.** W. A. Sheppard and A. N. Bourns. *Canadian Journal of Chemistry*, v. 32, Jan. 1954, p. 4-13.

Discusses results of experimental studies. Tables, diagram. 18 ref.

**6147 A New General Synthesis of 2-Amino Alcohols.** Louis Berlinguet. *Canadian Journal of Chemistry*, v. 32, Jan. 1954, p. 31-39.

24 ref.

**6148 Organic Chemistry: Naturally-Derived Compounds.** J. R. Majer. *Chemical Age*, v. 70, Jan. 9, 1954, p. 147-155.

Utilization of enzyme systems either in the living microorganism or as extracts from the organs of higher animals to carry out chemicals reactions is far from being a novel idea, but incorporation of these biochemical techniques into general synthetic and analytical organic chemistry is comparatively new.

**6149 Chromatographic Separation of Methyl-Glucoses.** W. J. Whelan and K. Morgan. *Chemistry & Industry*, 1954, no. 3, Jan. 16, p. 78.

Method has advantage of speed, reproducibility, and equal ease of application on the mg. or hg. scale. Table. 6 ref.

**6150* Interpretation of the Birnbaum-Simonini Reaction Mechanism.** (French.) Georges Darzens and Maxence Meyer. *Comptes rendus*, v. 237, no. 21, Nov. 23, 1953, p. 1334-1336.

Confirms importance of oxonium derivatives in transpositions. 3 ref.

**6151* Action of Iodine on Organic Compounds (Diphenyl-Hydantoin and Diphenyl-Thio Hydantoin).** (French.) Pierr Chabrier, Germaine Thuillier, and Klaudia Smarzewska. *Comptes rendus*, v. 237, no. 23, Dec. 9, 1953, p. 1531-1532.

Desulfurization by iodine to obtain cyclic quanidines.

**6152* Cholesterol. II.** Edgar S. Lower. *Drug and Cosmetic Industry*, v. 74, Jan. 1954, p. 52-53, 127-132.

Cholesterol emulsions and cholesterol and the skin are discussed in detail. Tables. (To be continued.)

**6153* Principles of Chromatography.** R. J. P. Williams. *Export Review*, v. 14, Jan. 1954, p. 25-27.

Chromatography is a simple technique for analysis of complex mixtures of compounds. Theoretically it can be treated as an extension of single stage purification procedures such as batch adsorption and extraction and is related to these procedures much as multistage fractional distillation is related to simple distillation. Graphs, photographs. 5 ref.

**6154* Filter Paper Electrophoresis: A Biophysical Laboratory Experiment.** Sister Mary Martinette. *Journal of Chemical Education*, v. 31, Jan. 1954, p. 18-19.

Describes an extremely, simple set-up applied to biophysics. Photographs. 6 ref.

**6155 Note on the Interaction of Methane and Water Vapor in the Hydrogen-Oxygen Reaction.** Arthur Levy. *Journal of Chemical Physics*, v. 21, Dec. 1953, p. 2132-2133.

Experimental data show methane and water vapor influence kinetics of reaction by similar processes. Graphs, tables.

**6156 The Kinetics of Alkene Oxymercuration.** Alan Rodgman and George F. Wright. *Journal of Organic Chemistry*, v. 18, Dec. 1953, p. 1617-1631.

Discusses results of experimental studies with particular emphasis on effect of acetic acid. Tables, graphs. 16 ref.

**6157 The Reactions of Carbamates With Alcohols.** Norman G. Gaylord and Cyrus E. Sroog.. *Journal of Organic Chemistry*, v. 18, Dec. 1953, p. 1632-1637.

Includes table. 27 ref.

**6158 Ring-Chain Tautomerism of the *cis*-β-Benzoylphenylacrylic Acids.** Colin L. Browne and Robert E. Lutz. *Journal of Organic Chemistry*, v. 18, Dec. 1953, p. 1638-1647.

Includes graphs, table. 15 ref.

**6159 Studies on the Dimerization of Styrene in Aqueous Sulfuric Acid.** Milton J. Rosen. *Journal of Organic Chemistry*, v. 18, Dec. 1953, p. 1701-1705.

Discusses experimental studies. Table, graph. 3 ref.

**6160 Ethylsilicion Esters and Transesterifications.** Herbert H. Anderson and George M. Stanislow. *Journal of Organic Chemistry*, v. 18, Dec. 1953, p. 1716-1722.

Includes table. 10 ref.

**6161 The Preparation and Cleavage Studies of Some Organosilicon Compounds.** Henry Gilman, Robert K. Ingham, and Arthur G. Smith. *Journal of Organic Chemistry*, v. 18, Dec. 1953, p. 1743-1749.

Results of experimental studies. Tables. 12 ref.

**6162 Extension of the Reformatsky Reaction to New Types of Compounds.** Reynold C. Fuson and Norman Thomas. *Journal of Organic Chemistry*, v. 18, Dec. 1953, p. 1762-1766.

Results of experimental studies are presented. 13 ref.

**6163 Mescaline Analogs. I. 2, 4, 6,-Trialkoxy-β-Phenethylamines.** F. Benington, R. D. Morin, and Leland C. Clark, Jr. *Journal of Organic Chemistry*, v. 19, Jan. 1954, p. 11-16.

Synthesis of several mescaline isomers is described. 26 ref.

**6164 Dimerization of Styrene in the Presence and Absence of Solvent.** B. B. Corson, Julian Dorsky, J. E. Nickels, W. M. Kutz, and H. I. Thayer. *Journal of Organic Chemistry*, v. 19, Jan. 1954, p. 17-25.

Experimental results are discussed. Graphs, table. 20 ref.

**6165 Aminocellulose Derivatives.** J. F. Haskins and A. H. Weinstein. *Journal of Organic Chemistry*, v. 19, Jan. 1954, p. 67-69.

6 ref.

**6166* The Hydrolysis of Picolinamide and Isonicotinamide in Concentrated Hydrochloric Acid Solutions.** H. H. G. Jellinek and J. R. Urwin. *Journal of Physical Chemistry*, v. 57, Dec. 1953, p. 900-902.

Discusses experimental studies. Tables, graphs. 7 ref.

**6167* The Rate of the Thermal Isomerization of β-Pinene in the Vapor Phase.** J. Erskine Hawkins and James W. Vogh. *Journal of Physical Chemistry*, v. 57, Dec. 1953, p. 902-905.

Includes table, diagram. 15 ref.

**6168* Flow Birefringence in Solutions of Macromolecules: Effect of Fluctuations of the Shape of the Molecule.** (English.) Roger Cerf. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 35-44.

Theoretical discussion and experimental verification. Table, graphs. 19 ref.

**6169* The Excluded Volume of Branched Chains.** (English.) F. Kreussling and R. Ullman. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 123-132.

Presents development of theory. 21 ref.

**6170* Improvement of the Dirt Suspending Power of CMC.** (English.) K. J. Nieuwenhuis. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 237-251; disc., p. 251-252.

Experiment using salts of carboxymethyl-cellulose (CMC) in large quantities to improve dirt-suspending power of synthetic detergents and soaps. Photograph, tables. 41 ref.

**6171* The Synthesis of Block Copolymers in a Flow System.** (English.) J. A. Hicks and H. W. Melville. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 461-468.

Includes diagram, graph, table. 9 ref.

*Chemistry—Organic*

**6172* Synthesis and Properties of a New Polyether: Poly-3,3-bis(Chloromethyl)-1-Oxabutene.** (English.) Alan C. Fathing and R. J. William Reynolds. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 503-507; disc., p. 507.
Includes tables. 5 ref.

**6173* An Approach to the Solution of Structure Problems of Organic Chain Polymres.** (English.) A. Bjornhaug, O. Ellefsen, and B. A. Tonnesen. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 621-632; disc., p. 632.
Includes graphs, photograph. 13 ref.

**6174* Gelation Reactions of Chlorosulfonated Polyethylems of Organic Chain Polymers.** (English.) A. Bjornhaug, Jr. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 599-610.
Includes tables. 4 ref.

**6175* Fischer-Tropsch Synthesis. I. Acitvity of Iron Catalyst at Atmospheric Pressure.** N. G. Basak and K. K. Bhattacharyya. **II. Studies With Fe-Cu-CaO-$K_2O$ Catalyst at Normal Pressure.** N. G. Basak and B. S. Subramanyam. *Journal of Scientific & Industrial Research*, v. 12, sec. B, Dec. 1953, p. 617-625.
Activity of such a catalyst, giving a high yield of hydrocarbons at atmospheric pressure is reported. Diagram, graphs. 21 ref.

**6176* Ampholytic Detergents.** Richard Neu. *Manufacturing Chemist*, v. 25, Jan. 1954, p. 10-11.
Discusses chemistry, properties, and application of these detergents which are both anion- and cation-active. Table.

**6177* Disinfectants and Disinfection.** *Manufacturing Chemist*, v. 25, Jan. 1954, p. 21-23.
Presents review of recent literature. 5 ref.

**6178 New and Known Complex Borohydrides and Some of Their Applications in Organic Syntheses.** János Kollonitsch, Oszkár Fuchs, and Valéria Gábor. *Nature*, v. 173, Jan. 16, 1954, p. 125-126.
4 ref.

**6179* The Reaction Between Styrene and Unsaturated Fatty Acids. III.** S. Kut. *Paint and Varnish Production*, v. 44, Jan. 1954, p. 34-37.
Discusses reaction with complex conjugated system. Tables. 16 ref.

**6180* The Synthesis of Isotopically Labelled Organic Compounds.** S. L. Thomas and H. S. Turner. *Quarterly Reviews*, v. 7, no. 4, 1953, p. 407-443.
Chemical and biological methods of synthesis are discussed. An account is given of methods of degradation used for location of labelled atoms in organic compounds. Tables. 417 ref.

**6181* Studies on Iron Catalyst for Synthesis of Alcohol From Water-Gas. I. Catalysts Containing $Al_2O_3$ and $K_2O$ as Principal Promoters.** (Japanese.) Hiroshi Uchida, Naoyuki Todo, and Kiyoshi Ogawa. *Reports of the Government Chemical Industrial Research Institute, Tokyo*, v. 48, no. 7, Sept. 1953, p. 266-276.
Describes performance of 4 systems at 25 kg. per sq. cm. Graphs, tables. 24 ref.

**6182 Substitution of Chlorine in Silicon Tetrachloride by Diisopropylamino and Ethylanilino Groups.** H. Breederveld and H. I. Waterman. *Research (Supplement)*, v. 7, Jan. 1954, p. 5-6.
Includes table. 3 ref.

**6183 Calculations of the Lower Excited Electronic Energy. Levels of *Cyclo*butadiene and Benzene.** W. Moffitt and J. Scanlon. *Royal Society, Proceedings*, v. 220, ser. A, Dec. 22, 1953, p. 530-541.
Method of atoms in molecules is used to calculate energies of lower electronic levels of *cyclo*butadiene and benzene molecules. Tables. 14 ref.

**6184* Production of Triuret From Uric Acid by Ultraviolet Irradiation.** Josef Fellig. *Science*, v. 119, Jan. 22, 1954, p. 129-130.
Presents results of experimental studies. 10 ref.

**6185* 40 Years of Soap Industry Progress.** Daniel H. Terry. *Soap and Sanitary Chemicals*, v. 30, Jan. 1954, p. 34-37, 95, 97.
Technological changes in the past 40 years have wrought great changes in soap products and marketing methods. Now half the number of soap firms sell three times as much as in 1913. 3 ref.

**6186* A Place for Aromatics in Soap Prefumery.** Oliver L. Marton and George F. Foy. *Soap and Sanitary Chemicals*, v. 30, Jan. 1954, p. 38-41, 105-106.
Explains entry of manufacturer of finished soaps, toiletries, and cosmetics into field of aromatic chemicals. Photographs.

**6187* Evaluation of Sea-Water Laundry Detergents.** Rubin Bernstein and Harry Sosson. *Soap and Sanitary Chemicals*, v. 30, Jan. 1954, p. 46-49, 99-100.
Includes tables, photographs, graph. 9 ref.

**6188* Optical Bleaches in Soap.** *Soap and Sanitary Chemicals*, v. 30, Jan. 1954, p. 85, 87, 89.
Apparent increase in light makes undyed fibers appear "whiter," delicate colors more luminous; yellowing of goods is compensated for by a dye of bluish fluorescence which creates an impression of "pure white."

*Books and Miscellaneous Publications*

**6189 The Chemistry of Isobutyraldehyde and Its Derivatives.** Hugh J. Hagemeyer and George C. DeCroes. 94 p. 1953. Tennessee Eastman Co., Kingsport, Tenn. (QO305.A6 H12c)
Includes chapters on synthesis; physical and chemical properties; and applications and handling problems.

**6190 Starch and Its Derivatives.** J. A. Radley. v. I-II. 3rd Rev. Ed. A Series of Monographs on Applied Chemistry, v. XI-XII. 510 and 465 p. 1953. Chapman & Hall Ltd., London. (TP415 R11s3)
Volume I covers the structure and reactions of starch; and amylases and their action on starch. Volume II includes manufacture, industrial applications, and examination and analysis of starch and starch products.

***See also:***
**7229** (structure of polyethylene)
**7232** (fluorocarbon radicals)
**7233** (properties of ion-exchange resins)
**7250** (symposium on macro-molecules)

## CHEMISTRY—PHYSICAL

**6191 Self-Diffusion of Cations in and Through Sulfonated Polystyrene Cation-Exchange Polymers.** G. E. Boyd and B. A. Soldano. *American Chemical Society, Journal*, v. 75, Dec. 20, 1953, p. 6091-6099.
Coefficients for Na, Zn, Y, Th, and other ions in Dowex-50 and similar resins at 25 C were studied by radio tracer techniques. Diagram, tables, graphs. 32 ref.

**6192 Self-Diffusion of Anions in Strong-Base Anion Exchangers.** B. A. Soldano and G. E. Boyd. *American Chemical Society, Journal*, v. 75, Dec. 20, 1953, p. 6099-6104.
Measurements for chloride, bromide, iodide, bromate, tungstate, and orthophosphate in Dowex-2 at 25 C are given. Tables. 22 ref.

**6193 Self-Diffusion of Water Molecules and Mobile Anions in Cation Exchangers.** G. E. Boyd and B. A. Soldano. *American Chemical Society, Journal*, v. 75, Dec. 20, 1953, p. 6105-6107.
Coefficients and activation energies for $H_2O^{18}$ and pure water in Dowex-50 were compared. Tables. 7 ref.

**6194 Self-Diffusion of Cations in Hetero-Ionic Cation Exchangers.** B. A. Soldano and G. E. Boyd. *American Chemical Society, Journal*, v. 75, Dec. 20, 1953, p. 6107-6110.

Diffusion coefficients and activation energies for Na, Zn, and La ions are compared with their values in pure (i.e. homoionic) exchanger salt forms. Tables, graph. 8 ref.

**6195 Potentiometric Methods for Following Reaction Rates.** H. Kwart and W. C. Wilson. *American Chemical Society, Journal*, v. 75, Dec. 20, 1953, p. 6147-6151.

Solvolytic reaction rates can be determined by this method. Diagrams, table, graphs. 8 ref.

**6196 The Thermodynamic Properties and Configuration of Unsymmetrical Dimethylhydrazine.** J. G. Aston, J. L. Wood, and T. P. Zolki. *American Chemical Society, Journal*, v. 75, Dec. 20, 1953, p. 6202-6204.

Studies were made from 12 to 298 K. Tables. 16 ref.

**6197 The Solubility of Oxygen in Water.** L. M. Zoss, S. N. Suciu, and W. L. Sibbitt. *ASME, Transactions*, v. 76, Jan. 1954, p. 69-70; disc., p. 70-71.

Results of experimental studies. Table, diagram, graphs. 8 ref.

**6198 Recent Trends in Thermochemistry.** H. Mackle. *Chemical Age*, v. 70, Jan. 9, 1954, p. 167-173.

Choice of standard states; vaporization and sublimation heats; experimental determination of $(\Delta H_f)25°$; heats of combustion; and bomb colorimetry are covered in detail. 64 ref.

**6199* The Photochemistry of Selenium. IV. Photogalvanic Effects With Grey Selenium.** R. W. Pittman. *Chemical Society, Journal*, 1953, Dec., p. 3888-3893.

Effects on grey Se coated Au electrodes in aqueous HCl. Graphs. 4 ref.

**6200* The Production of Active Solids by Thermal Decomposition. I. Introduction.** S. J. Gregg. **II. Ferric Oxide.** S. J. Gregg and K. J. Hill. **III. The Calcination of Kaolinite.** S. J. Gregg and M. J. Stephens. *Chemical Society, Journal*, 1953, Dec., p. 3940-3956.

If calcining releases a volatile component from a solid, the graph of specific surface against temperature shows a maximum, a steady rise (or fall), or is essentially flat. Photographs, tables, diagram, graphs. 45 ref.

**6201* Electron Interaction in Unsaturated Hydrocarbons.** J. A. Pople. *Faraday Society, Transactions*, v. 49, Dec. 1953, p. 1375-1385.

An approximate form of molecular orbital theory of unsaturated hydrocarbon molecules in their ground states is developed. 27 ref.

**6202* The Molar Refraction of Condensed Aromatic Compounds.** J. Schuyer, L. Blom, and D. W. van Krevelen. *Faraday Society, Transactions*, v. 49, Dec. 1953, p. 1391-1401.

Increment of molar refraction can be explained in terms of high degree of mobility of $\pi$-electrons and planar structure of compounds. Graph, tables. 19 ref.

**6203* The Solubility of Solids in Gases. II.** A. H. Ewald. *Faraday Society, Transactions*, v. 49, Dec. 1953, p. 1401-1405.

Solubility of *p*-chloroiodobenzene in compressed ethylene was measured between 13 and 31.5 C and at pressures up to 100 atmospheres using a radioactive tracer technique. Table, graph, diagram. 5 ref.

**6204* The Chemical Effects of Pressure. I.** J. Buchanan and S. D. Hamann. *Faraday Society, Transactions*, v. 49, Dec. 1953, p. 1425-1433.

Rate constants between 1 and 300 atmospheres have been measured for unimolecular solvolyses of *tert*-butyl chloride and benzotrichloride. Graphs, tables, diagram. 33 ref.

**6205* The Exchange of Oxygen Isotopes Between Water and Hydrated Chromic Chloride.** H. A. E. Mackenzie and A. M. Milner. *Faraday Society, Transactions*, v. 49, Dec. 1953, p. 1437-1442; disc., p. 1442-1443.

Exchange of $^{18}O$ between water and hexaquochromic chloride in solution has been studied kinetically. Tables, diagrams. 8 ref.

**6206* Mechanism of the Decomposition of Acetyl Peroxide in Acetic-2-$C^{14}$ Acid.** Arthur Fry, B. M. Tolbert, and Melvin Calvin. *Faraday Society, Transactions*, v. 49, Dec. 1953, p. 1444-1448; disc., p. 1448-1450.

Reaction in acetic-2-$C^{14}$ acid and distribution of activity in the reaction products were investigated. Diagrams, table. 11 ref.

**6207* Molten Salt Mixtures. I. Electrical Conductivities, Activation Energies of Ionic Migration and Molar Volumes of Molten Binary Halide Mixtures.** H. Bloom, I. W. Knaggs, J. J. Molloy, and D. Welch. *Faraday Society, Transactions*, v. 49, Dec. 1953, p. 1458-1465.

Electrical conductivities and densities of the system $NaNO_2+NaNO_3$, $CdCl_2+CdI_2$, $KBr+BaBr_2$, $LiCl+CdCl_2$, $KCl+NaI$, $KI+NaCl$, $CdI_2+KI$, and $KNO_3+KBr$ have been investigated completely from the liquids to, where possible, 800 C. Tables, graphs. 7 ref.

**6208* Monolayer Capacities in Multilayer Adsorption.** P. C. Carman and F. A. Raal. *Faraday Society, Transactions*, v. 49, Dec. 1953, p. 1465-1471.

Equation for measuring monolayer capacities has been studied for cases of butane on a silica powder and $NH_3$ on a furnace black. Graphs, table. 16 ref.

**6209* Solution to the Poisson-Boltzmann Equation for the Potential Distribution in the Double Layer of a Single Spherical Colloidal Particle.** N. E. Hoskin. *Faraday Society, Transactions*, v. 49, Dec. 1953, p. 1471-1477.

Solutions to the equation, covering wide ranges of the particle radius and surface potential, are obtained numerically. Tables. 7 ref.

**6210* Evaluation of True Zeta Potential of the Particles of An $As_2S_3$ Sol in the Presence of Equicoagulating Concentration of Electrolytes.** B. N. Ghosh. *Faraday Society, Transactions*, v. 49, Dec. 1953, p. 1477-1481.

Includes tables. 16 ref.

**6211* Dimensions of Solute Particles From Dynamic Properties of Their Solutions.** A. G. Ogston. *Faraday Society, Transactions*, v. 49, Dec. 1953, p. 1481-1489.

Published data on a variety of solutes are compared and interpreted in terms of a spheroidal model. Tables, graph. 33 ref.

**6212* Retardation Kinetics in Polymerization and Depolymerization Processes.** G. M. Burnett and P. R. E. J. Cowley. *Faraday Society, Transactions*, v. 49, Dec. 1953, p. 1490-1495.

Validity of current methods of determining rates of chain initiation from retardation data has been examined. Graphs. 10 ref.

**6213 Structure Sensitivity in the Reactivity of Solids.** Alex P. Rice. *Industrial Chemist and Chemical Manufacturer*, v. 30, Jan. 1954, p. 3-9.

Discusses influence of non-equilibrium defects on surfaces and reactivity of solid substances. Graphs, tables. 27 ref.

**6214 The Surface Properties of Silica Gels. I. Importance of *p*H in the Preparation From Sodium Silicate and Sulphuric Acid.** K. S. W. Sing and J. D. Madeley. *Journal of Applied Chemistry*, v. 3, Dec. 1953, p. 549-556.

Includes graphs, table. 21 ref.

**6215 The Preparation of Light Water by Distillation: Its Composition, and the Densities and Fractionation Factors of Its Isotopes.** H. E. Watson. *Journal of Applied Chemistry*, v. 3, Dec. 1953, p. 556-563.

Ratio $H_2{}^{18}O:H_2{}^{17}O$ in light-water samples of the same density, obtained by distillation, does not vary greatly, so that their composition may be determined from their density alone. Graphs, tables. 13 ref.

**6216 Electronic Properties of Carbons and of Their Interstitial Bisulfate Compounds.** E. A. Kmetko. *Journal of Chemical Physics*, v. 21, Dec. 1953, p. 2152-2158.

Electronic properties of bisulfate compounds formed by oxidation of carbons in sulfuric acid are considered. Graphs, diagram. 10 ref.

## *Chemistry—Physical*

**6217 Diffusional Processes in the Growth of Aerosol Particles. II.** H. L. Frisch and F. C. Collins. *Journal of Chemical Physics*, v. 21, Dec. 1953, p. 2158-2165.

Effect of growing particles upon diffusional processes for special case of sinks with stationary boundaries. Graphs, table. 15 ref.

**6218* The Structure and Electrical Conductivity of Hydrocarbon-Based Solutions of the "Soluble Oil" Type. A Comparable Aqueous System.** J. Bromilow and P. A. Winsor. *Journal of Physical Chemistry*, v. 57, Dec. 1953, p. 889-895.

Includes diagram, graphs, tables. 13 ref.

**6219* The Adsorption of Silver Salts on Silver.** Cecil V. King and Ruth Kimmelman Schochet. *Journal of Physical Chemistry*, v. 57, Dec. 1953, p. 895-898.

Includes graphs, tables. 11 ref.

**6220* On the Determination of Critical Micelle Concentrations by a Bubble Pressure Method.** Lawrence M. Kushner and Willard D. Hubbard. *Journal of Physical Chemistry*, v. 57, Dec. 1953, p. 898-899.

Discusses experimental results. Graphs. 3 ref.

**6221* Liquid-Vapor Equilibrium in the System Uranium Hexafluoride-Hydrogen Fluoride.** Roger L. Jarry, Fred D. Rosen, Charley F. Hale, and Wallace Davis, Jr. *Journal of Physical Chemistry*, v. 57, Dec. 1953, p. 905-909.

Includes graphs, tables, diagram. 8 ref.

**6222* Determination of Particle Sizes in Colloidal Silica.** G. B. Alexander and R. K. Iler. *Journal of Physical Chemistry*, v. 57, Dec. 1953, p. 932-934.

Includes tables, graph. 5 ref.

**6223* The Vibrational Spectra of Some Tin and Germanium Halogen Metalorganic Compounds.** Ellis R. Lippincott, Philip Mercier, and Marvin C. Tobin. *Journal of Physical Chemistry*, v. 57, Dec. 1953, p. 939-942.

Includes tables. 8 ref.

**6224* Studies on Ion Exchange Resins. VI. Water Vapor Sorption by Polystyrenesulfonic Acid. VII. Water Vapor Sorption by Cross-Linked Polystyrenesulfonic Acid Resins.** Monroe H. Waxman, Benson R. Sundheim, and Harry P. Gregor. *Journal of Physical Chemistry*, v. 57, Dec. 1953, p. 969-978.

Experimental methods and results. Graphs, tables. 36 ref.

**6225* Pressure Dependence of the Dielectric Constant of Water and the Volume Contraction of Water and *n*-Butanol Upon Addition of Electrolyte.** F. E. Harris, E. W. Haycock, and B. J. Alder. *Journal of Physical Chemistry*, v. 57, Dec. 1953, p. 978-979.

Includes tables, graph. 9 ref.

**6226* Symposium on the Chemistry of Certain Less Familiar Elements.** *Journal of Physical Chemistry*, v. 58, Jan. 1954, p. 1-33.

Includes "The Uncatalyzed Exchange of $Cl^-$ and $AuCl_4^-$", Ronald L. Rich and Henry Taube; "The Induced Exchange of $Cl^-$ and $AuCl_4^-$: Evidence of Au(II)", Ronald L. Rich and Henry Taube; "Anion Exchange Studies. IX. Adsorbability of a Number of Metals in Hydrochloric Acid Solutions", Kurt A. Kraus, Frederick Nelson, and Gilbert W. Smith; "The Preparation of a Solid Rhenide", Justo B. Bravo, Ernest Griswold, and Jacob Kleinberg; "The Present Status of Elements 85 and 87", Earl K. Hyde; "The Complexing of Indium (III) by Fluoride Ions in Aqueous Solution. Free Energies, Heats and Entropies", L. G. Hepler, John W. Kury, and Z. Z. Hugus, Jr.; and "Kinetics of the Oxidation of Vanadium(II) and Vanadium (III) Ions by Perchlorate Ion", William R. King, Jr. and Clifford S. Garner. Graphs, tables. 96 ref.

**6227* Heat of Wetting of Copper, Graphite and Silica Gel.** F. E. Bartell and R. Murray Suggitt. *Journal of Physical Chemistry*, v. 58, Jan. 1954, p. 36-40.

Determniations were made of unit area heats of wetting and net heats of adsorption of ten liquids on graphite, and of five liquids each on silica gel and on Cu powders. Diagram, tables. 21 ref.

**6228* A New Method for Calculating Dissociation Constants From Spectrophotometric Data.** David H. Rosenblatt. *Journal of Physical Chemistry*, v. 58, Jan. 1954, p. 40-42.

New method developed for calculation of apparent dissociation constants of mono- and (in many cases) di-basic acids. Should prove of value in situations where it is inadvisable or impossible to determine extinction coefficients of pure ionic or molecular forms. Method requires a small number of determinations. Tables. 6 ref.

**6229* The Mechanism of Gas Phase Radiation-Chemical Reactions.** Harry Essex. *Journal of Physical Chemistry*, v. 58, Jan. 1954, p. 42-49.

From effect of electric fields on ion yield and other experimental data, extent can be calculated to which a gaseous radiation-chemical reaction is initiated by each of four primary mechanisms. Effect of the nature of irradiation on ion yields and maximum ion yields possible for each mode or initiation are discussed. Graphs, diagram. 28 ref.

**6230* The Adsorption and the Magnetic Ortha-Para Conversion of Hydrogen of Diamagnetic Solids. I. Some Experiments in Surface Paramagnetism. II. The Relative Adsorbabilities of Orthohydrogen and Parahydrogen.** Y. L. Sandler. *Journal of Physical Chemistry*, v. 58, Jan. 1954, p. 54-61.

Includes tables, graphs. 24 ref.

**6231* Ion-Exchange Membranes. I. Equations for the Multi-Ionic Potential.** M. R. J. Wyllie. **II. Membrance Properties in Relation to Bi-Ionic Potentials in Monovalent Ion Systems.** M. R. J. Wyllie and Shirley L. Kanaan. *Journal of Physical Chemistry*, v. 58, Jan. 1954, p. 67-80.

Includes tables, graphs, diagram. 52 ref.

**6232* Electrical Potential of Nylon Fibers in Aqueous Media.** Frederick T. Wall and Patricia Saxton. *Journal of Physical Chemistry*, v. 58, Jan. 1954, p. 83-86.

Electrical potential of a nylon fiber interacting with solutions of bases is calculated from theoretical considerations and previously obtained experimental data. Table. 12 ref.

**6233* Heats of Adsorption of Argon on a Series of Carbon Blacks Graphitized at Successively Higher Temperatures.** R. A. Beebe and D. M. Young. *Journal of Physical Chemistry*, v. 58, Jan. 1954, p. 93-96.

Results illustrate change in shape of heat-coverage curve with increasing degree of surface homogeneity produced by high temperature heat treatment. Graphs. 20 ref.

**6234* Problems in the Physical Chemistry of Polyelectrolytes.** A. Katchalsky. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 159-182; disc., p. 182-184.

Synthetic polyelectrolytes with special attention to their electrostatic potentials, colligative properties of their solutions, and molecular sharp changes. Diagram, table, graphs. 92 ref.

**6235* Interaction Between Polyelectrolytes and Heteropolar Precipitates.** (English.) Bozo Tezak and Stanka Kratohvil. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 221-227.

Experimental studies on gum arabic, agar agar, gelatin. 4 ref.

**6236 Crystal Structure of Benzene at —3°C.** E. G. Cox and J. A. S. Smith. *Nature*, v. 173, Jan. 9, 1954, p. 75.

Two hundred eighty-eight independent reflection intensities, representing 56% of the total possible with Cu radiation, were estimated visually from oscillation photographs. Tables. 7 ref.

**6237 Thermal Treatment of Raney Nickel Catlyst.** Jiro Yasumura. *Nature*, v. 173, Jan. 9, 1954, p. 80.

Four samples of catalyst containing 49.96% Ni were developed by usual method and heated at 250, 300, and 400 C respectively in a stream of $H_2$ for 3 hr. Micrographs, table. 3 ref.

**6238 The Viscosity of Hydrogen and Deuterium at Pressures Up to 2000 Atmospheres.** (English.) A. Michels, A. C.

J. Schipper, and W. H. Rintoul. *Physica*, v. 19, no. 10, Oct. 1953, p. 1011-1028.

Viscosity has been measured with transpiration method at temperatures between 25 and 125 C at pressures up to 2000 atmospheres. Tables, graphs, diagrams. 19 ref.

**6239* Molecular Structure Determination by X-Ray Crystal Analysis: Modern Methods and Their Accuracy.** G. A. Jeffrey and D. W. J. Cruickshank. *Quarterly Reviews*, v. 7, no. 4, 1953, p. 335-376.

Includes tables, diagrams, graphs. 88 ref.

**6240* The Crystal-Growth Process of Crystals Far From the Phase Equilibrium.** (German.) Ludwig Graf. *Zeitschrift für Naturforschung*, v. 8a, no. 12, Dec. 1953, p. 824-826.

Rapid crystal growth is explaind by "kinetic" forms of equilibrium in which rate of crystal growth depends only on conditions at point of growth. 7 ref.

**6241* Investigation of the Kinetics of the Reaction Between "Potassium Persulfate and Oxalic Acid".** (English.) Satya Prakash Srivastava and Satyeshwar Ghosh. *Zeitschrift für physikalische Chemie*, v. 202, nos. 3-4, Oct. 1953, p. 191-197.

Studies were made of the reaction between $K_2S_2O_8$ and oxalic acid. It was found that results are fairly reproducible. Tables. 6 ref.

*See also:*
**6116** (magnetism and inorganic chemistry)
**6375** (conductivity of electrolytes)
**6494** (flow properties of disperse systems)
**6573** (atmospheric aerosols)
**6638** (properties of analine)

## COATINGS

**6242 An Evaluation of the Use of the Refractory Oxides $Al_2O_3$ and $SiO_2$ in Eliminating a Gas-Produced Enamel Defect.** Richard G. Rion. *American Ceramic Society, Bulletin*, v. 33, Jan. 1954, p. 16-20.

Includes graphs, tables. 12 ref.

**6243 Reasons Why Paints Do Not Give Expected Service.** John C. Moore. *American Paint Journal*, v. 38, Jan. 18, 1954, p. 70, 72, 74, 76, 78, 80-81, 84, 86 88-89; disc., p. 89-93.

Includes photographs.

**6244 Testing and Research.** Francis Scofield. *Amerian Paint Journal*, v. 38, Jan. 25, 1954, p. 86-89, 92, 94.

Lecture XVI in the Practical Paint Course, The New England Production Club. Discusses behavior of plasticizers and pigment suspension.

**6245 Carbide Flame-Plating.** W. L. Donnelly. *American Society of Tool Engineers, Technical Papers and Panel Discussion*, (Annual Volume), v. 21, 1953, 5 p. + 3 plates.

Coatings from 0.0005 to 0.020-in. thick are currently being applied to a wide variety of base metals, including hardened tool steels, Cu, brass, Al, and Ti.

**6246 New Electrosparking Process for the Hard Facing of Cutting Tools.** G. P. Ivanov. *Henry Brutcher, Altadena, Cal., Translation no.* 2821, 13 p. (From *Stanki i Instrument*, v. 22, no. 5, 1951, p. 20-22.)

Investigation to improve electrical factors of the electrosparking machine used. Optimum conditions of electrospark hard facing; most favorable size and location of hard coatings deposited on the tool; and most suitable electrode material. Graphs, diagram.

**6247 Permanent Pigments From the Earth and the Air.** P. J. Cauterman. *Canadian Chemical Processing*, v. 38, Jan. 1954, p. 50-52, 54.

Synthetic $Fe_2O_3$ pigments are discussed. Photomicrographs, photographs.

**6248* Galvanizing Furnace With Combined Heating by Radiation and Circulation.** H. Rückemesser. *Draht, (English Ed.)*, 1953, no. 17, Dec., p. 41-42.

Discusses design, operating characteristics, advantages, and difficulties to be considered. Diagrams.

**6249 A Commercial Gas Plating Process.** *Electroplating and Metal Finishing*, v. 7, Jan. 1954, p. 16-18.

Discusses principles and techniques of process. Diagram, table.

**6250 Porosity of Sprayed Coatings. III. Impregnation and Organic Finishing of Sprayed Coatings.** D. de Paauw. *Electroplating and Metal Finishing*, v. 7; *Metal Spraying*, v. 4, Jan. 1954, p. 35, 37-38.

Describes process of sealing pores of sprayed metals to improve corrosion resistance. 33 ref.

**6251 Adherence Tests for Porcelain Enamels and High Temperature Ceramic Coatings. I.** George Warren. *Finish*, v. 11, Jan. 1954, p. 33-35, 104-105.

Presents discussion of destructive type tests and complete information on Porcelain Enamel Institute standard adherence test. Photographs, diagrams, graph, table. 9 ref.

**6252 Hot Spray Lacquering of Naval Aircraft.** William A. Gottfried. *Finish*, v. 11, Feb. 1954, p. 29-31, 82.

Discusses surface preparation, metal conditioning, priming, and lacquering. Diagram, tables.

**6253 Adherence Tests for Porcelain Enamels and High Temperature Ceramic Coatings. II. Application of Standard PEI Adherence Test to High Temperature Coatings.** George Warren. *Finish*, v. 11, Feb. 1954, p. 53-54.

Includes tables, photographs.

**6254 What's New in Pipe Coatings?** George D. Lain. *Heating, Piping & Air Conditioning*, v. 26, Jan. 1954, p. 164-165.

New plastics with metallic coatings is proving to be successful in extending service life. Photograph, diagram.

**6255 Finishing System for Magnesium.** Hugo A. Barbian. *Industrial Finishing*, v. 30, Jan. 1954, p. 38-40, 42, 44, 46, 48, 50, 52, 54, 56-57.

Describes nature of Mg corrosion and coating systems developed by Dow Chemical Co. Diagrams.

**6256* Progress With Fluorescent Materials.** A. E. Williams. *Industrial Finishing (London)*, v. 6, Dec. 1953, p. 324-328, 330.

Describes organic and inorganic materials, their incorporation in resins, and their applications. Switzer patent (U.S.P. 2,498,592) is cited. Photographs.

**6257* Tests for Use on Vitreous Enamel Finishes.** *Industrial Finishing (London)*, v. 6, Dec. 1953, p. 346, 348.

Eight simple tests are described.

**6258* Industrial Colour Harmony.** *Industrial Finishing (London)*, v. 6, Dec. 1953, p. 350-354.

Discusses psychological aspects of color and its application. Tables.

**6259* Finishing Titanium.** Thomas A. Dickinson. *Industrial Finishing (London)*, v. 6, Dec. 1953, p. 356-358.

Vacuum deposition, anodizing, and ceramic coating is illustrated. Photographs.

**6260* Hard Facts About Hard Facing.** John Wischhusen. *Industry & Welding*, v. 27, Feb. 1954, p. 49-53, 55, 84-85.

Discusses equipment and techniques employed. Photographs, diagram.

**6261 Electrostatic Detearing Improves Dip-Coating Quality.** J. J. Obrzut. *Iron Age*, v. 173, Feb. 4, 1954, p. 153-155.

Smooth, uniform coatings are obtained on dip-coated parts by removing tears and fatty edges electrostatically. Photographs.

**6262* Conserve Critical Materials by Ceramic Coating of Jet Engine Hot Parts.** J. V. Long. *Machine and Tool Blue Book*, v. 49, Jan. 1954, p. 244-247, 250, 252-254, 256-257.

Role of protection coatings in making possible substitution of lower alloys at high temperatures. Photographs.

**6263* Further Development of the Technique of Metal Spraying.** (German.) Hans Reininger. *Metalloberfläche*, Ausgabe B, v. 6, no. 1, Jan. 1954, p. 6-11.

Presents a literature review. Discusses Dickinson's process in which metal spray is concentrated on electrostatic fields; Hart-

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mann's ultrasonic sprayer; and Ballhusen's centrifugal metal sprayer. Photographs, diagrams, micrographs. 34 ref. (To be continued.)

**6264* Coating Wickets and Cleaning Ovens.** M. A. Glaser. **II.** *Modern Lithography*, v. 22, Jan. 1954, p. 59, 61-62.
Results of tests using silicone resins in painting ovens.

**6265* Some Aspects of High Speed Litho Coating.** C. H. Groff. *Modern Lithography*, v. 22, Feb. 1954, p. 85, 87, 89.
Discusses equipment and techniques involved.

**6266 New Drying Oils Produced by Solvent Segregation.** F. J. H. Le Riche and A. L. Stubbs. *Oil & Colour Chemists' Association, Journal*, v. 37, Jan. 1954, p. 8-22; disc., p. 22-25.
Gives reference to use of liquid propane in "Solexol" process. Mechanical, physical, and technical properties of drying oils so produced are detailed. Oils having improved drying, color retention, and uniformity of properties, produced by segregation of sunflower seed and fish oils, are described. Tables. 4 ref.

**6267 Cadmium Pigments.** P. J. Curtis and R. B. Wright. *Oil & Colour Chemists' Association, Journal*, v. 37, Jan. 1954, p. 26-42; disc., p. 42-43.
Pigments derived from Cd sulphide, Cd sulphoselenides, and co-precipitants. Graphs, table, diffraction pattern. 10 ref.

**6268 Apparatus for the Laboratory Testing of the Wash and Scrub Resistance of Water Paints.** D. Atherton and W. Peace. *Oil & Colour Chemists' Association, Journal*, v. 37, Jan. 1954, p. 44-47.
Gives test and results. Diagrams.

**6269 Instrumental Methods for Testing Organic Finishes.** John E. Hyler. *Organic Finishing*, v. 15, Jan. 1954, p. 9-22.
Discusses equipment and techniques. Photographs.

**6270 The Determination of Particle Size. II.** N. Corcoran. *Paint Manufacture*, v. 24, Jan. 1954, p. 19-21.
Discusses elutriation and sedimentation methods of particle size determination, the two best suited for paint raw materials. Diagram.

**6271* Tall Oil-Dehydrated Castor Oil Blends.** T. C. Patton and W. Lindlaw. *Paint and Varnish Production*, v. 44, Jan. 1954, p. 21-29, 72.
Discusses proper techniques for preparing economical quality varnishes. Describes their performance characteristics. Tables, graphs. 7 ref.

**6272* Quality Control in the Paint Industry. III.** Lawrence Shatkin. *Paint and Varnish Production*, v. 44, Jan. 1954, p. 30-33.
Discusses control of raw materials and finished products. 37 ref.

**6273 Radiometric Study of Supplementary Chromate Coatings for Zinc and Cadmium Plating.** Stanley L. Eisler, Jodie Doss, and Mary Ann Henderson. *Plating*, v. 41, Feb. 1954, p. 147-154.
Radio sulfur and radio chromium were used to determine amounts of sulfate and Cr contained in coatings produced from various supplementary dip solutions. Tables. 5 ref.

### *Books and Miscellaneous Publications*

**6274 Organic Protective Coatings.** William von Fischer and Edward G. Bobalek, editors. 387 p. 1953. Reinhold Publishing Corp., New York City. (TP935 V98o)
Consists of 16 papers individually abstracted on the subject of paint and varnishes as an engineering material.

**6275 Paint as an Engineering Material.** W. von Fischer. Paper from ORGANIC PROTECTIVE COATINGS. p. 1-27. 1953. Reinhold Publishing Corp., New York. (TP935 V89o)
Functional properties and engineering data for a given coating depends on special nature of the problem. Table, drawings, photographs. 2 ref.

**6276 Principles of Paint Formulation.** Edward G. Bobalek. Paper from ORGANIC PROTECTIVE COATINGS. p. 28-47. 1953. Reinhold Publishing Corp., New York. (TP935 V89o)
Objective must be a satisfactory coating that can be produced economically in large volume. Tables. 7 ref.

**6277 Pigment Dispersion in Paint Formulation.** David M. Gans. Paper from ORGANIC PROTECTIVE COATINGS. p. 48-60. 1953. Reinhold Publishing Corp., New York. (TP935 V89o)
Some basic relationships studied by rheological methods are discussed. Graphs, table, diagram. 3 ref.

**6278 Anticorrosive Pigments.** Arnold J. Eickhoff. Paper from ORGANIC PROTECTIVE COATINGS. p. 61-80. 1953. Reinhold Publishing Corp., New York. (TP935 V89o)
Four theories on mechanism of corrosion. Photographs, graphs, tables, diagrams. 37 ref.

**6279 Design for Reflectance Properties.** J. R. DeVore. Paper from ORGANIC PROTECTIVE COATINGS. p. 81-98. 1953. Reinhold Publishing Corp., New York. (TP935 V89o)
Optical properties are determined primarily by absorption, refractive index, and particle size of pigments in the paint. Photograph, photomicrograph, diagrams, graphs. 8 ref.

**6280 Luminescent Coatings. A. Inorganic Pigments.** J. R. DeVore. **B. Organic Colors.** Edward G. Bobalek. Paper from ORGANIC PROTECTIVE COATINGS. p. 99-118. 1953. Reinhold Publishing Corp., New York. (TP935 V89o)
Discusses visible portion of the spectrum involving processes of absorption and radiation. 9 ref.

**6281 Reflectance Spectrophotometry of Pigmented Materials: Color Matching Calculations.** J. L. Saunderson. Paper from ORGANIC PROTECTIVE COATINGS. p. 119-154. 1953. Reinhold Publishing Corp., New York. (TP935 V89o)
Calculations based on appropriate spectrophotometric data can predict the colors of many pigment mixtures used in paints and plastics. Graphs, diagram. 7 ref.

**6282 New Pigments in Modern Color Design.** Edmond C. Botti. Paper from ORGANIC PROTECTIVE COATINGS. p. 155-166. 1953. Reinhold Publishing Corp., New York. (TP935 V89o)
Classification table is presented. Available products and current developments are discussed. 4 ref.

**6283 Vinyl Resins for Organic Protective Coatings. A. General Theory of Formulation.** R. W. Quarles. **B. Stabilizers for Vinyl Resins.** R. E. Lally. **C. Recent Developments in the Theory and Use of Plasticizers for Vinyl Resins.** H. Grinsfelder. Paper from ORGANIC PROTECTIVE COATINGS. p. 167-209. 1953. Reinhold Publishing Corp., New York. (TP935 V89o)
Includes graphs, micrographs, tables. 27 ref.

**6284 Aminoplast Resins for Organic Coatings.** Charles H. Parker and Frank J. Hahn. Paper from ORGANIC PROTECTIVE COATINGS. p. 210-225. 1953. Reinhold Publishing Corp., New York. (TP935 V89o)
Chemistry, types, applications, and future prospects of this material are discussed. Tables, graphs. 8 ref.

**6285 Hot Spray Lacquers.** R. F. Wint and F. E. Piech. Paper from ORGANIC PROTECTIVE COATINGS. p. 260-280. 1953. Reinhold Publishing Corp., New York. (TP935 V89o)
Economic advantages of this method of application are presented. Tables, graphs. 29 ref.

**6286 Fundamentals of Formulating Emulsion and Latex Paints.** William von Fischer. Paper from ORGANIC PROTECTIVE COATINGS. p. 281-303. 1953. Reinhold Publishing Corp., New York. (TP935 V89o)
Presents general theory on emulsion systems with applications to water-containing paints. Tables. 8 ref.

**6287 Metal Protection With Synthetic Resin Coatings.** E. E. McSweeney. Paper from ORGANIC PROTECTIVE

COATINGS. p. 304-321. 1953. Reinhold Publishing Corp., New York. (TP935 V89o)

Four general factors affect ability of an organic coating to protect metal from corrosion. Their influence on formulation, application, and performance of protective coatings are presented. Micrographs, photograph, graphs, tables. 14 ref.

**6288 Organic Coatings for Electrical Insulation.** A. J. Sherburne. Paper from ORGANIC PROTECTIVE COATINGS. p. 321-347. 1953. Reinhold Publishing Corp., New York. (TP935 V89o)

Discusses major uses of insulating materials; their composition and properties; and problems involved in their development. Graph, photographs, table, drawings. 13 ref.

**6289 Silicone Resins in Heat-Resistant Paints.** Myron Kin. Paper from ORGANIC PROTECTIVE COATINGS. p. 348-364. 1953. Reinhold Publishing Corp., New York. (TP935 V89o)

Chemistry of silicones and their properties as applied in paints are presented. Photographs, graphs, tables. 21 ref.

**6290 Diffusion Coatings.** D. M. Dovey, I. Jenkins, and K. C. Randle. Paper from PROPERTIES OF METALLIC SURFACES, SYMPOSIUM. INSTITUTE OF METALS, MONOGRAPH AND REPORT SERIES 13. p. 213-236; disc., p. 295-364. 1953. Institute of Metals, London. (TS213 P94)

Mechanism involved in cementation processes is discussed in relation to adsorptoin and diffusion of the coating element. Photographs, graphs, table, micrographs. 27 ref.

*See also:*
**6000** (ceramic coatings on metals)
**6130** (autoxidation of hydrocarbons)
**6311** (coating of water mains for corrosion protection)
**6832** (vacuum metallizing)
**7253** (flame spraying of polyethylene)
**7384** (wood properties and paint)

## CORROSION

**6291* Corrosion by Water at Low Flow Velocity.** T. E. Larson and R. M. King. *American Water Works Association, Journal*, v. 46, Jan. 1954, p. 1-9.

Need for fresh-water corrosion research is discussed. Experiments demonstrate behavior of solutions at corrosion cell electrodes. Provides possible explanation for inhibitory effect of bicarbonate and carbonate alkalinity. Graphs, photographs, tables. 9 ref.

**6292* The Oxidation Process in Titanium Carbide-Cobalt Hard Metals.** (German.) Willy Kinna and Otto Rüdiger. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 11-12, Nov.-Dec. 1953, p. 535-542.

X-ray, electron-ray, metallographic, and ultramicroscopic investigations indicated parabolic law of oxidation in 600-1000 C range. Tables, graphs, micrographs.

**6293 Electrolytic Etching of Stainless Steels. Results of Cooperative Testing Program for the Evaluation of the Oxalic Acid Etching Tests.** M. A. Streicher. **Electroytic Etching in Oxalic Acid Used to Screen Cast CF-8 and CF-8M Stainless Steels From the 240-Hr. Nitric Acid Test.** F. H. Beck, N. D. Greene, Jr., and M. G. Fontana. **Screening Cast Stainless Steels by Electrolytic Etching in Oxalic Acid.** G. W. Jackson and W. A. Luce. *ASTM Bulletin*, 1954, no. 195, p. 63-74.

Includes tables, photomicrographs, photograph. 12 ref.

**6294 $200 Million Down the Drain.** *Bakelite Review*, v. 25, Jan. 1954, p. 16-18.

Illustrates application of pressure-sensitive vinyl tape to control corrosion on underground pipelines. Photographs.

**6295* Experimental Set-Up for Investigating Ash Deposition and Corrosion Phenomena on Gas-Turbine Materials at High Temperatures.** C. Kind. *Brown Boveri Review*, v. 40, nos. 5-6, May-June 1953, p. 196-199.

Describes effect of fuel ash deposits on machine construction materials. Photographs, graphs.

**6296 Inhibition of Corrosion of Nitrided Steel in Sulfuric Acid.** S. A. Balezin and V. B. Ratinov. *Henry Brutcher, Altadena, Cal., Translation no.* 2984, 5 p. (From *Doklady Akademii Nauk*, v. 85, no. 2, 1952, p. 367-368.)

Nitriding treatment of specimens is discussed. Gravimetric, electrochemical, and optical data are described. Graph, table. 5 ref.

**6297 Corrosion Characteristics of Alloying Elements in Stainless Steels in Oxidizing Solutions. Corrosion of Chromium.** M. M. Kurtepov and G. V. Akimov. *Henry Brutcher, Altadena, Cal., Translation no.* 3036, 5 p. (From *Doklady Akademii Nauk SSSR*, v. 87, no. 5, 1952, p. 795-796.)

Previously abstracted from original. See item 12775, v. 2, Nov. 1953.

**6298 On the Mechanism of Corrosion Fatigue.** G. V. Karpenko. *Henry Brutcher, Altadena, Cal., Translation no.* 3159, 8 p. (From *Doklady Akademii Nauk SSSR*, v. 77, no. 5, 1951, p. 827-830.)

Discusses failure of existing schemes to explain all phenomena connected with cyclic stressing in a corrosive medium. Presents new explanation based on experimental data. Micrographs, graph.

**6299* Concerning Steels Resistant to Temperature Exceeding 450 C. II.** Georges Vidal. *Chaleur & Industrie*, v. 34, no. 341, Dec. 1953, p. 350-356.

Discusses corrosion resistance and strength of various steels. Graphs, photograph. 6 ref.

**6300 Chlorimet 2.** Walter A. Luce. *Chemical Engineering*, v. 61, Feb. 1954, p. 246, 248, 250, 252.

Discusses resistance of this material of construction to a number of corrosives, with physical properties and applications in chemical industry. Photograph, tables, diagrams.

**6301 Development of Cathodic Protection in Belgium.** A. Weiler. *Chemistry & Industry*, 1954, no. 3, Jan. 16, p. 56-63.

Shows how a particular case of protection against stray currents started a train of research which led to development of means of protection against corrosion from all sources. Diagrams, graphs.

**6302 Cathodic Production. Economic Aspects of Corrosion Control.** D. H. Lewis and O. C. Mudd. *Chemistry & Industry*, 1954, no. 4, Jan. 23, p. 93-100. (Paper read at a Symposium on Cathodic Protection, Corrosion Group of the Society of Chemical Industry at Inst. of Electrical Engineers, London, Nov. 13, 1953.)

Stresses economic aspects of corrosion control and role of cathodic methods in a properly balanced program for protection of pipe-lines and similar underground structures. Graphs, tables.

**6303 Experiences With Filming Amines in Control of Condensate Line Corrosion.** H. L. Kahler and J. K. Brown. *Combustion*, v. 25, Jan. 1954, p. 55-58.

Includes photographs, diagram, tables. 4 ref.

**6304* Thirty Years' Experience in Testing Aluminum Paint Performance.** Robert I. Wray. *Corrosion*, v. 10, Feb. 1954, p. 50-58.

Descriptions and illustrations are given of results achieved with coatings of various kinds, including different formulations of Al paint on steel and Al bases. Photographs.

**6305* Paint vs. Corrosion—Some Aspects of the Problem in the Gulf Coast Area.** V. B. Volkening. *Corrosion*, v. 10, Feb. 1954, p. 63-69.

Discusses theory of metallic corrosion. Presents methods of testing and examples of coating successes and failures. Photographs, tables. 7 ref.

**6306* The Measurement of Electrode Potentials.** Norman Hackerman. *Corrosion*, v. 10, Feb. 1954, p. 70-72.

Few half cells of interest in corrosion measurements are described in terms of their preparation and use. Brief descriptions of potential measuring devices and their principles of operation are given.

## *Corrosion*

**6307* The Use of Organic Protection Coatings in Controlling Corrosion.** Edward G. Bobalek. *Corrosion*, v. 10, Feb. 1954, p. 73-81.

Composition, preparation, and application of organic coatings are discussed. Mechanism by which coatings retard corrosion are listed and relative value of barrier and polarizing coatings mentioned. Graph, tables.

**6308 Corrosion Inhibition in Acid Solution.** Cecil V. King and Edward Hillner. *Electrochemical Society, Journal*, v. 101, Feb. 1954, p. 79-83.

Measurements were made of the effectiveness of three inhibitors on Fe, Zn, and Cd specimens in nitrate solutions. Tables. 13 ref.

**6309 Microstructure and the Corrodibility of Steel in Inhibited Hydrochloric Acid Solutions.** P. H. Cardwell. *Electrochemical Society, Journal*, v. 101, Feb. 1954, p. 84-90.

Two acid inhibitors were examined to investigate materials which could be used satisfactorily to protect steels with various grain structures. Tables, graph, photomicrographs. 10 ref.

**6310* Field and Loboratory Method for Investigating Corrosion.** J. B. Armstrong. *Gas*, v. 30, Feb. 1954, p. 99, 101-102, 104.

Adapted from a paper presented at the annual meeting, California Natural Gasoline Assn., Los Angeles, Oct. 1953. Discusses corrosivity evaluation and means of visual and instrument inspections. Photographs, diagrams. 4 ref.

**6311* Protection of Water Mains Against Corrosion. Report of the Second International Congress on Water Supply in Paris 1952.** (German.) H. Steinrath. *Gas und Wasserfach*, v. 95, Ausgabe Wasser, no. 2, Jan. 15, 1954, p. 46-47.

Discusses susceptibility of cast iron, steel, and various types of concrete to soil corrosion. Describes efficiency of various protective coatings.

**6312 Sensitive Corrosion Measurements With an Interferometer.** *Glass Industry*, v. 35, Feb. 1954, p. 82, 106.

Techniques adaptable to optical glass, procelain enamel, quartz, other natural and artificial silicates, and various metals. Photographs.

**6313 The Oxidation of Titanium at High Temperatures in an Atmosphere of Pure Oxygen.** A. E. Jenkins. *Institute of Metals, Journal*, v. 82, Jan. 1954, p. 213-221 + 1 plate.

Investigation in temperature range 600-925 C, at an oxygen pressure of 700 mm. of Hg. Graphs, tables. 13 ref.

**6314 Behaviour of Galvanized Steel in Sodium Benzoate Solution.** P. T. Gilbert and S. E. Hadden. *Journal of Applied Chemistry*, v. 3, Dec. 1953, p. 545-546, 547-548.

Electrochemical measurements showed that in certain circumstances, steel became anodic to Zn. Reasons are discussed. Table. 5 ref.

**6315 Corrosion of Nickel Cast Irons in Soils.** Irving A. Denison and Melvin Romanoff. *Journal of Research, National Bureau of Standards*, v. 51, Dec. 1953, p. 313-320.

Results of measurements of corrosion and strength of Ni cast irons after expsoure to different soil conditions for a maximum of 14 years are reported. Photographs, tables. 4 ref.

**6316* How Does Wrought Iron Stand Up in Corrosive Marine Services.?** J. Lyell Wilson. *Marine Engineering*, v. 59, Feb. 1954, p. 63-66.

Discusses lack of correlation between testing results and service records. Graphs, photographs, tables.

**6317* Corrosion Tests on Aluminum.** (German.) *Metall*, v. 8, nos. 1-2, Jan. 1954, p. 31.

Effect of impurities on susceptibility of Al and Al alloys. Table. 6 ref.

**6318* Local Tendencies of Solution Pressure of Metals to Change Under Slight Stresses.** (German.) Paul Koch. *Metalloberfläche*, Ausgabe A, v. 8, no. 1, Jan. 1954, p. 1-7.

Investigations were made of effect of stresses on corrosiveness of metals. Table, diagrams, graphs. (To be continued.)

**6319 Laboratory Measurement of Corrosion in Soils.** *National Bureau of Standards, Technical News Bulletin*, v. 38, Jan. 1954, p. 13-14.

Six-month test is shown to agree with ten-year field tests. Cell uses differential aeration of metal discs in contact with soil.

**6320 Don't Be Misled About "Corrosion Resistance".** W. L. Nelson. *Oil and Gas Journal*, v. 52, Feb. 1, 1954, p. 98.

Data on common corrosion resistant alloys and steels are presented. Table.

**6321 Combating Corrosion, A Special Symposium.** *Oil and Gas Journal*, v. 52, Feb. 15, 1954, p. 122-130, 132, 134-136, 141-143, 145-150, 152-156, 159-160, 162-164.

Includes "Corrosive Oil and Gas Areas in the United States", D. A. Shock; "How to Get More Value From Paint", William T. Thies; "Protecting the Pipe-Line Protection", Frank B. Burns; "Management's Stake in Corrosion Mitigation", Lewis Finch, Jr.; "New Light on Asphalt Pipe-Line Coatings", H. C. McAninch; "How to Sell Management on Corrosion Mitigation", Ted L. Canfield; "Cold-Applied Coal-Tar Coatings", W. F. Fair, Jr.; "Organic Inhibitors in Oil and Gas Wells", P. D. Muir; "Semipolar Organic Inhibitors Check Corrosion", Charles M. Blair; "Microbiological Corrosion", J. Bennett Clark; "Cathodic Protection for Pipe Lines", B. J. Whitley, Jr.; "Fundamental Electrochemistry of Corrosion", Bernard O. Heston; "Good Design Now Will Stop Corrosion Later", F. A. Prange; "Hot Coal-Tar Coatings Approach Ideal", N. T. Shideler. Maps, diagrams, tables, photographs, graphs. 16 ref.

**6322* New Techniques—Current Problems in Controlling Corrosion. II.** O. C. Mudd. *Pipe Line News*, v. 26, Feb. 1954, p. 34-39.

Effectiveness of corrosion control measures can be improved by modifications giving better results from materials and energy presently used in mitigation measures. Includes construction features conserving protective current; adapting or designing accessory equipment to withstand destructive forces; and choice of protective coating materials having good potential service life at a reasonable cost. Photographs, graphs, table.

**6323* The Water Side Deterioration of Diesel Cylinders.** *Power Engineering*, v. 58, Jan. 1954, p. 76-77.

Successful application of high chromate concentrations, material selection, vibration dampening, and air injection. Photographs. 3 ref.

**6324* Machine Tool Corrosion by Soluble Cutting Oils. II.** *Product Finishing*, v. 7, Jan. 1954, p. 74-86.

Discusses results of investigation of the corrosive action of 11 oils on cast iron similar to that used in machine tool construction. Tables, graphs.

**6325 The Corrosion of Copper Tube Used in Soil-Stack Installations.** H. E. Babbitt, E. R. Baumann, and H. N. Hayward. *University of Illinois Bulletin, (Engineering Experiment Station Bulletin Series no.* 419,) v. 51, no. 17, Oct. 1953, 42 p.

Corrosion evaluation of 14 Cu specimnes was made by visual observation, weight loss, increase of electrical resistance, and depth of pitting. Tables, photographs, diagrams, graphs.

**6326 A Fundamental Investigation of Fretting Corrosion.** H. H. Uhlig, I. Ming Feng, W. D. Tierney, and A. McClellan. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3029, Dec. 1953, 52 p. (TL570 Un3t)

Summarizes all phases of an investigation of fretting corrosion which has been conducted over a period of several years. Photographs, tables, diagrams, graphs. 32 ref.

**6326a* Effect of Heat Treatment on Intercrystalline Corrosion Resistance of Stainless Steel 1Kh18N9T Containing Various Ratios of Carbon and Titanium.** (Russian.) E. I.

Astrov and V. N. Biriukova. *Vestnik Mashinostrocniia*, v. 33, no. 9, Sept. 1953, p. 61-65.

Tests show that quenching temperature for optimum properties depends on grain size, C content, and C-Ti ratio. Micrographs, tables. 5 ref.

**6327* Anodic Behavior of Nickel in Hydrochloric Acid, Sodium Chloride, and Nickel Chloride Solutions.** (German.) Willi Machu and Adly Ragheb. *Werkstoffe und Korrosion*, v. 4, no. 12, Dec. 1953, p. 429-436.

Describes experiments showing action of Ni in acid and salt solutions. Tables, graphs. 12 ref.

**6328* Corrosion Problem.** (German.) Bruno Waeser. *Werkstoffe und Korrosion*, v. 4, no. 12, Dec. 1953, p. 437-442.

Discusses corrosion, prevention, and resistance tests. 86 ref.

**6329* The Mechanism of Oxidation and Corrosion Processes in Metals and Alloys.** (German.) Karl Hauffe. *Zietschrift für Metallkunde*, v. 44, no. 12, Dec. 1953, p. 576-583.

Shows that Wagner and Schattky's disorder theory can be used to explain corrosion mechanism. Discusses disorder phenomena in various oxides and high-temperature oxidation of various alloys. Graphs, diagrams. 37 ref.

**6330* The Rusting of Steel Objects Due to Penetration of Water Vapor, Sulfur Dioxide, and Hydrogen Sulfide Through a Layer of Spindle Oil.** (Russian.) V. V. Skorchelletti and S. D. Vasil'ev. *Zhurnal Prikladnoi Khimii*, v. 26, no. 10, Oct. 1953, p. 1033-1038.

Results demonstrate possibility of rusting under an oil layer. Tables, graphs, drawings. 3 ref.

*Books and Miscellaneous Publications*

**6331 Chemical Behaviour as Influenced by Surface Condition.** U. R. Evans. Paper from PROPERTIES OF METALLIC SURFACES, SYMPOSIUM. INSTITUTE OF METALS, MONOGRAPH AND REPORT SERIES 13. p. 253-280; disc., p. 295-364. 1953. Institute of Metals, London. (TS213 P 94)

Effect of surface condition on corrosion probability, distribution, and velocity is discussed. Micrographs. 61 ref.

***See also:***
**6255** (corrosion of Mg.)
**6383** (corrosion plated alloys)
**6615** (corrosion of heat-resistant steel)
**6714** (corrosion of Ti)
**6879** (corrosion of nitrided Ti)

## ELECTRICAL ENGINEERING

**6332 Improving a DC Motor.** R. E. Schuette. *Aero Digest*, v. 68, Jan. 1954, p. 46, 48, 50, 52.

New method of winding d.c. rotor betters performance, efficiency, and reduces arcing. Tables, diagrams, graph.

**6333 Analysis of Measured Magnetization and Pull Characteristics.** R. L. Peek, Jr. *Bell System Technical Journal*, v. 33, Jan. 1954, p. 79-108.

Specific analytical and graphical procedures are given for evaluation of magnetic circuit constants from both pull and magnetization measurements. Tables, graphs, diagrams, photographs. 6 ref.

**6334 Estimation and Control of the Operate Time of Relays. I. Theory.** R. L. Peek, Jr. **II. Design of Optimum Windings.** M. A. Logan. *Bell System Technical Journal*, v. 33, Jan. 1954, p. 109-186.

Dynamic equations applying to operation and release of electromagnets are derived in a form in which armature position and flux linkages of the coil are variables to be determined as functions of time. Diagrams, graphs. 12 ref.

**6335* Rectifiers Displace Motor Generator Sets Aboard Naval Vessels.** Aldo J. Rovero. *Bureau of Ships Journal*, v. 2, Feb. 1954, p. 29-33.

High power, ease of repair, and silent operations are among valuable characteristics. Photographs. tables, diagrams.

**6336* A Magnetic Amplifier for Synchros.** R. L. Van Allen. *Communication and Electronics*, 1954, Jan., p. 749-756; disc., p. 756-757.

A basic single core magnetic amplifier for synchronous set-up is discussed. Diagrams, graphs, tables. 6 ref.

**6337* The Use of Electric Network Analyzers for Pipe Network Analysis.** Robert E. Stephenson and J. R. Eaton. *Communication and Electronics*, 1954, Jan., p. 857-861.

Newly developed method for adapting conventional a.c. or d.c. network analyzers to pipe network problems is presented. Table, diagrams. 6 ref.

**6338* Method of Measuring the Dielectric Constant of Gases in the Hyper-Frequency Range.** (French.) Adriano Gozzini and Eliseo Polacco. *Comptes rendus*, v. 237, no. 23, Dec. 9, 1953, p. 1497-1499.

Apparatus enables determination by measuring variation of time interval. Diagram, oscillogram.

**6339 Principles of Feedback Control.** Julius Y. Kaplan and Sidney Davis. *Consulting Engineer*, v. 3, Jan. 1954, p. 45-47, 66.

Discusses open and closed loop modes of servo controls. Diagrams.

**6340* Applying Automation Techniques to Motor Testing.** V. Spagnuolo. *Electrical Manufacturing*, v. 53, Feb. 1954, p. 96-100.

Automatic testing unit will aid production output. Diagrams, photograph.

**6341* Simplifying Fabrication of Printed Circuits.** E. R. Gamson, A. Henesian, and R. W. Remington. *Electrical Manufacturing*, v. 53, Feb. 1954, p. 122-125, 342.

Fabrication of planar conductors (two dimensional wiring) based on a realistic evaluation of various available methods. Tables, diagrams.

**6342* Effect of Temperature on Iron Powder Cores.** George Katz. *Electrical Manufacturing*, v. 53, Feb. 1954, p. 135-137.

Heat tests on two types of high-frequency cores show changes in Q that may affect performance where close tolerances are required. Photograph, graphs, table.

**6343* Protecting Relay Contacts Against Arcing.** Howard N. Sachar. *Electrical Manufacturing*, v. 53, Feb. 1954, p. 138-139, 330, 332.

Selenium rectifiers prevent inductive voltages from reaching the arc potential at the contacts. Graph, oscillograms, photographs, diagrams. 10 ref.

**6344* Electrical World's 50th Statistical Issue.** *Electrical World*, v. 141, Jan. 25, 1954, p. 147-153.

Reviews past operations and future trends. Tables, graphs.

**6345* How Do Reclosers Affect Fuse Link Performance?** R. E. Riebs and R. H. Amundsen. *Electrical World*, v. 141, Feb. 8, 1954, p. 88-89, 163.

Curves presented can be used to predict behavior of a fuse link subjected to repeated faults. Graphs.

**6346 Positive D-C Corona on Polyethylene-Insulated Wire in Air.** D. S. Rodbell, J. B. Whitehead, and C. F. Miller. *Electrochemical Society, Journal*, v. 101, Feb. 1954, p. 91-98.

Electric strength of air under atmospheric conditions, when d.c.v. are applied to the wire. Oscillograms, table, diagrams, graphs. 15 ref.

**6347 Flexible Leads for Low-Frequency Electric Furnaces.** M. Eaton and S. B. Thomas. *Electrochemical Society, Journal*, v. 101, Feb. 1954, p. 110-116.

Development of water-cooled cables is traced. Data are given on construction, current ratings, life expectancy, and other characteristics. Diagrams, table, photographs.

**6348* Electrical Engineering in 1953. II.** *Engineer*, v. 197, Jan. 8, 1954, p. 63-65.

Nuclear reactors for electric power generation; electrical manufactures and exports; and electronically controlled paper-mak-

## *Electrical Engineering*

ing sectional machine drive are discussed. Photographs. (To be continued.)

**6349 Analysis of Network Response to Periodic Waves.** Philip M. Seal. *Franklin Institute, Journal,* v. 257, Jan. 1954, p. 13-24.

Outlines operational method used in analysis. Rules for obtaining the inverse transform are given. Reasoning behind the rules is discussed. Diagrams, tables. 4 ref.

**6350 High Power Dielectric Heating for Industrial Use.** W. H. Hickok. *Industrial Heating,* v. 21, Jan. 1954, p. 122-124, 126-133.

Use of H. F. energy and improvement of dielectric heating equipment from 1940 to 1952. Graphs, diagrams, drawing, table.

**6351 Use of Magnetic Amplifiers in Control Circuits.** R. T. Lucas. *Iron and Steel Engineer,* v. 31, Jan. 1954, p. 74-75; disc., p. 76-77.

Satisfactory application of magnetic amplifiers on loop control of pickle lines.

**6352 6900-Volt Power System Fault Relay Analysis.** James A. B. Pinney. *Iron and Steel Engineer,* v. 31, Jan. 1954, p. 99-109; disc., p. 109-113.

System fault analysis is necessary to calibrate system protective relays to provide minimum interruption of critical circuits. Diagrams, photographs, graph, tables. 5 ref.

**6353* The Use of High-Speed Electromagnetic Relays in the Measurement of Capacitance and Frequency.** A. C. Jason. *Laboratory Practice,* v. 3, Jan. 1954, p. 25-27.

Two methods are described. The first relates to method of repeated ballistic discharge, the second to use of a slightly modified form of the Maxwell commutator bridge. Diagrams, table.

**6354 Three Core, 132 kV, Cable Installation.** *Machinery Lloyd (Overseas Ed.)* v. 26, Jan. 16, 1954, p. 85-90.

Discusses cable design and makeup; manufacturing and testing; and installation. Photographs, graphs.

**6355 Application of the Hall Effect in a Semi-Conductor to the Measurement of Power in an Electromagnetic Field.** H. M. Barlow. *Nature,* v. 173, Jan. 2, 1954, p. 41-42.

**6356 All-Electric Rig Drilling in Ventura Avenue Field.** Martin Mears and Charles J. Manner. *Oil and Gas Journal,* v. 52, Feb. 1, 1954, p. 64-67, 89.

Advantages of electrical power in drilling operations. Photographs, diagrams, graphs.

**6357 Some Measurements on a Not Selfsustaining Gas Discharge, With an Axial Magnetic Field.** (English.) J. Kistemaker and J. Snieder. *Physica,* v. 19, no. 10, Oct. 1953, p. 950-960.

Investigation of depth of potential trough as a function of arc current, pressure, and concentration of various gas mixtures. Graphs, table, diagram. 10 ref.

**6358* Now! 97% Efficiency With the Mechanical Rectifier.** *Power,* v. 98, Feb. 1954, p. 77-81.

Top d.c. power efficency, with varying motor load, is offered through a simple commutating reactor and Ag contacts. Photographs, diagrams.

**6359* The Wahleach Hydroelectric Development.** T. Ingledow and J. H. Steede. *Power Apparatus and Systems,* 1953, no. 9, Dec., p. 1077-1088; disc., p. 1088.

Construction and operation of a high-lead plant. Photographs, diagrams, map.

**6360* Is the European Circuit-Breaker Rating System Really More Conservative Than the American?** R. C. Van Sickle. *Power Apparatus and Systems,* 1953, no. 9, Dec., p. 1100-1109; disc., p. 1109-1114.

Comparison of two systems. Tables. 10 ref.

**6361* Direct-Current Power Transmission.** J. G. Holm. *Power Apparatus and Systems,* 1953, no. 9, Dec., p. 1114-1119; disc., p. 1119-1120.

Principles of d.c. transmission using electronic power converters are discussed. 17 ref.

**6362* Techniques and Examples of High-Voltage D-C Testing of Rotating-Machine Windings.** C. L. Sidway and B. R. Loxley. *Power Apparatus and Systems,* 1953, no. 9, Dec., p. 1121-1125; disc., p. 1125-1129.

Techniques and examples of making d.c. high-voltage tests on complete stator windings of large rotating machines. Graphs, tables. 8 ref.

**6363* Abnormal Voltage Conditions Produced by Open Conductors on 3-Phase Circuits Using Shunt Capacitors.** P. E. Hendrickson, I. B. Johnson, and N. R. Schultz. *Power Apparatus and Systems,* 1953, no. 9, Dec., p. 1183-1193.

Abnormal line conditions are discussed. Corresponding connections are presented. Oscillograms, graphs, diagrams, tables. 7 ref.

**6364* A System Operator's View of Ice Melting on a Power Line While in Service.** O. L. Oehlwein. *Power Apparatus and Systems,* 1953, no. 9, Dec., p. 1200-1206; disc., p. 1206-1207.

Use of angular displaced voltages to melt ice on transmission lines. Diagrams, tables, graph. 3 ref.

**6365* Submarine Cables.** Andrew Bodicky. *Power Apparatus and Systems,* 1953, no. 9, Dec., p. 1227-1234; disc., p. 1234-1236.

Design of cables and use of proper installations. Drawings, photographs, graphs. 22 ref.

**6366* Life of Silver-Surfaced Contacts on Repetitive Arcing Duty.** W. R. Wilson. *Power Apparatus and Systems,* 1953, no. 9, Dec., p. 1236-1243; disc., p. 1243.

An investigation of breakdown point of Ag under varied conditions. Photographs, tables, diagrams, graphs. 5 ref.

**6367* Protection of Turbine Generators and Boilers by Automatic Tripping.** H. A. Bauman, J. M. Driscoll, P. T. Onderdonk, and R. L. Webb. *Power Apparatus and Systems,* 1953, no. 9, Dec., p. 1248-1255; disc., p. 1255-1260.

System is set up for boiler-turbine-generator unit-type installation which gives faster response to faulty conditions. Graphs, photographs, diagrams. 4 ref.

**6368* Pipe Losses in Nonmagnetic Pipe.** L. Meyerhoff. *Power Apparatus and Systems,* 1953, no. 9, Dec., p. 1260-1272; disc., p. 1272-1275.

Evaluation of losses under three-phase operation of cable in pipe. Diagrams, tables, graphs. 5 ref.

**6369* System Recovery Voltage and Short-Circuit Duty for High-Voltage Circuit Breakers.** I. B. Johnson, A. J. Schultz, and W. F. Skeats. *Power Apparatus and Systems,* 1953, no. 9, Dec., p. 1339-1345; disc., p. 1345-1347.

Recovery rate requirements as they may exist about 1960 and how they might affect the design of circuit breakers. Graphs, diagrams, photograph, oscillograms. 11 ref.

**6370 Convenient Form of Bridge Network for Conductivity Measurements at Audio Frequencies.** E. D. Goddard, E. H. Higham, and J. C. Stewart. *Research (Supplement),* v. 7, Jan. 1954, p. 7-8.

Results of experimental studies. Diagrams, graph. 2 ref.

**6371 New Regulated Drive of a Rod Mill.** (German.) Karl Meister. *Stahl und Eisen,* v. 74, no. 3, Jan. 28, 1954, p. 151-154.

An a.c. shunt collector motor may be used for increasing efficiency. Photograph, diagrams, tables, graphs.

**6372* Controlling Various Mechanisms of Rotating Furnaces by Electric Motors.** (Russian.) V. S. Lanin and I. L. Shul'man. *Tsement,* v. 19, no. 5, Sept.-Oct. 1953, p. 8-15.

Various circuits for signalling, dust removal, and slag feeding are described. Diagrams.

**6373* Voltage-Reference Node.** Jacob Shekel. *Wireless Engineer,* v. 31, Jan. 1954, p. 6-10.

General method of analyzing linear networks without specifying the node to which all voltages are referred. Diagrams. 9 ref.

***See also:***
**6022** (electric properties of ceramics)
**6288** (organic electric insulation)
**6344** (trends in electrical industry)
**6355** (measurement of electromagnetic power)
**6388** (electrochemical generation of electricity)
**6416** (electrical propetries of Si)
**6720** (electric cable with pressed Al casing)
**6771** (development of electrode controls on electric furnaces)
**7130** (appraisal of nuclear power)
**7281** (electrical insulation)

## ELECTROCHEMISTRY AND ELECTROPROCESSES

**6374 Why Line Your Sludge Tank With Diamonds?** N. W. Thibault and B. H. Anderson. *American Machinist,* v. 98, Feb. 15, 1954, p. 154-156.

Electrolytically-assisted diamond-wheel grinding continues to show promise as a commercial method for sharpening single-point carbide tools without sacrificing tool performance. Photographs, tables.

**6375* Influence of Urea on Electrical Conductivity of Electrolytes. II. Study of Acid and Alkaline Solutions.** (French.) Roger Cohen-Adad. *Bulletin de la société chimique de France,* 1953, nos. 11-12, Nov.-Dec., p. 1099-1104.

Includes table, graphs. 32 ref.

**6376* Chromium Electrodeposition.** Lois Jean Frolen. *Chemistry,* v. 27, Jan. 1954, p. 34-39.

Investigation to find satisfactory theory concerning mechanism of Cr-electrodeposition on a solid cathode. Photograph, phase diagrams, tables.

**6377 A Suggested Method of Evaluating the Porosity of Coatings on Ferrous Metals.** T. W. Farrer. *Chemistry & Industry* 1954, no. 3, Jan. 16, p. 77-78.

This objective is sought either by simulating corrosive conditions to which coating will be exposed in service, or by employing artifical means whereby porosity may be revealed. 3 ref.

**6378 Anodic Behavior of Aluminum and Its Alloys in Sulfuric Acid Electrolytes.** Ralph B. Mason and Phyllis E. Fowle. *Electrochemical Society, Journal,* v. 101, Feb. 1954, p. 53-59.

Main factors affecting rate of solution of anodic oxide coatings on Al as they are being formed. Graphs. 13 ref.

**6379 The Mechanism of the Anodic Formation of Lead Chromate.** Carl Wagner. *Electrochemical Society, Journal,* v. 101, Feb. 1954, p. 60-62.

Diffusion and convection processes during the electrolysis of a solution of sodium chromate and sodium chlorate between Pb electrodes. Graphs. 11 ref.

**6380 Electrolytic Reduction of Benzoic, Phenylacetic, and Cinnamic Acids and Esters at a Platinized-Platinum Cathode.** Shinichi Ono, Tadao Hayashi, and Jyunichi Nakaya. *Electrochemical Society, Journal,* v. 101, Feb. 1954, p. 104-109.

A study in alcoholic sulfuric acid solution. Tables, diagram. 10 ref.

**6381 Electrochemical and Electrometallurgical Industries of Canada. III. Ontario and Manitoba.** A. C. Holm. *Electrochemical Society, Journal,* v. 101, Feb. 1954, p. 41C-49C.

Industries and their nation's major power developments. Photographs.

**6382 An Introduction to Throwing Power and Covering Power in Electroplating Solutions. I.** R. Pinner. *Electroplating and Metal Finishing,* v. 7, Jan. 1954, p. 9-15.

Discussion of definitions and methods of testing. Diagrams, graphs. (To be continued.)

**6383* Tin-Nickel and Nickel/Chromium Coatings; Some Comparative Corrosion Tests.** S. C. Britton and R. M. Angles. *Institute of Metal Finishing, Bulletin,* v. 3, Winter, 1953, p. 259-280.

Materials, methods of test, and results are discussed. Tables, photographs. 4 ref.

**6384* Electroplating and Soldering as Allied Processes.** Alan Whittaker. *Mechanical World and Engineering Record,* v. 134, Jan. 1954, p. 26-28.

Production of many components is facilitated by using processes of electroplating and soldering in combination. Methods are outlined which ensure maximum efficiency when both processes are included in production layout.

**6385* Rapid Control of Electrolytes Used in Precipitation of Metals. Effect of Fluorine in Zinc-Sulfate Solutions.** (German.) E. Bertorelle. *Metalloberfläche,* Ausgabe B, v. 6, no. 1, Jan. 1954, p. 2-5.

Triangular cell determines composition and impurities in electrolytes by measuring flow of electric current. Tables, graphs, micrographs, diagrams, photograph. 4 ref.

**6386 Project No. 13: The Nature, Cause and Effect of the Porosity in Electrodeposits. I. The Porosity of Electrodeposits.** Fielding Ogburn and Asaf Benderly. *Plating,* v. 41, Feb. 1954, p. 169-173.

Includes tables, photographs.

**6387* Automatic Process Control in Metal Plating.** Leo Walter. *Products Finishing,* v. 18, Feb. 1954, p. 42-46, 48, 50, 52.

Practical considerations necessary for automation design. Photographs, diagrams. 1 ref.

**6388 Electrochemical Generation of Electricity.** R. G. H. Watson. *Research,* v. 7, Jan. 1954, p. 34-40.

Possibility of achieving higher efficiencies than are obtainable with electromechanical generators driven by heat engines. Progress which has been made so far in construction of fuel cells and future developments are discussed. Diagrams, graph, table. 18 ref.

**6389* Test in Production of Master Specimens of Accurate Surface by the Electroforming Method.** (Russian.) M. G. Boguslavskii. *Stanki i Instrument,* v. 24, no. 11, Nov. 1953, p. 19-20.

Method reproduced surface contour with good accuracy. Specimens are corrosion and wear resistant. Photographs, diagrams.

**6390* Current Density Distribution in Eelectroplating by Use of Models.** Gilbert Ford Kinney and John V. Festa. *Sylvania Technologist,* v. 7, Jan. 1954, p. 19-23.

Method of utilizing models in study of electric fields. Diagrams, graphs.

**6391* On the Theory of Electrolytic Crystal Growth.** (German.) Wolfgang Lorenz. *Zeitschrift für physikalische Chemie,* v. 202, nos. 3-4, Oct. 1953, p. 275-291.

Effects of conditions of electrolysis and electric current fields on crystallization. Diagrams. 25 ref.

*Books and Miscellaneous Publications*

**6392 The Nature and Properties of the Anodic Film on Aluminium and Its Alloys.** H. W. L. Phillips. Paper from PROPERTIES OF METALLIC SURFACES, SYMPOSIUM. INSTITUTE OF METALS, MONOGRAPH AND REPORT SERIES 13. p. 237-252; disc., p. 295-364. 1953. Institute of Metals, London. (TS213 P94)

Film is hard and possesses little ductility; it is translucent or transparent; and is a good electrical insulator. Graphs, micrograph, spectrograms, table. 57 ref.

***See also:***
**6306** (electrode potentials)
**6939** (electropolishing for stress analysis)
**6978** (electrolytic grinding)
**7181** (control of plating operations)

## ELECTRONICS

**6393 The New Golden-Ear Amplifier. I.** Joseph Marshall. *Audio Engineering*, v. 38, Jan. 1954, p. 17-18, 46-48.

Unit combines virtual direct coupling, neutralization, two feedback loops, and high degree of balancing and is reasonably free of distortion at normal volume levels. Diagrams, photographs.

**6394 Design of a Professional Tape Recorder.** William F. Boylan and William E. Goldstandt. *Audio Engineering*, v. 38, Jan. 1954, p. 20-22, 60-61.

Design and operational features of new high-quality machine. Photographs, diagram, graph.

**6395 Preamp With "Presence".** C. G. McProud. *Audio Engineering*, v. 38, Jan. 1954, p. 23-25, 55-57, 59.

Circuit departs from "flat" to provide elusive quality called presence and incorporates most features desired by critical listener. Photographs, graphs, diagram.

**6396 Handbook of Sound Reproduction. Chapt. XV. II. The Power Supply, Hum, and Noise.** Edgar M. Villchur. *Audio Engineering*, v. 38, Jan. 1954, p. 27-29, 39-41.

Includes diagrams, table. 4 ref.

**6397 The High-Pressure Glow Discharge in Air.** W. A. Gambling and H. Edels. *British Journal of Applied Physics*, v. 5, Jan. 1954, p. 36-39.

Observations on high-pressure glow in air between Cu and W electrodes and characteristics for discharge lengths from 0 to 8 mm. and currents from 0.01 to 0.5 amp. Photograph, graphs, table. 10 ref.

**6398* Reliability of Electronic Equipment.** E. J. Nucci. *Bureau of Ships Journal*, v. 2, Feb. 1954, p. 5-10.

Various programs to insure dependable easy-to-maintain units. Photographs.

**6399* Gas Tube Filament Connections.** Morris Brenner and H. G. Schmitt. *Communication and Electronics*, 1954, Jan., p. 776-784; disc., p. 784-785.

Termination of inert gas-filled power tubes by contact pins and sockets and by flexible leads with pressure-type terminals is evaluated quantitatively. Photographs, tables, graphs. 8 ref.

**6400* Solutions of Boundary-Value Problems on Automatic Computing Equipment.** Frank M. Verzuh. *Communication and Electronics*, 1954, Jan., p. 813-821.

Solution of ordinary differential equations with five different computers. Diagrams, graph, table, photographs. 14 ref.

**6401* Nondestructive Sensing of Magnetic Cores.** Dudley A. Buck and Werner I. Frank. *Communication and Electronics*, 1954, Jan., p. 822-830.

Method involves use of a quadrature magnetic field which produces an output voltage, polarity of which contains information. Diagrams, photographs, graphs, tables.

**6402* Effect of Noise From Oscillator Tubes.** (French.) Augustin Blaquiére. *Comptes rendus*, v. 237, no. 21, Nov. 23, 1953, p. 1316-1318.

Compares effect of grid and thermic noise on conditions of auto-oscillator tube. Diagrams.

**6403* Motion of an Electron in the Magnetic Vibrator.** (French.) René Combe and Marc Feix. *Comptes rendus*, v. 237, no. 21, Nov. 23, 1953, p. 1318-1320.

Describes solution of motion equations. Application is contemplated for production of electromagnetic waves of very short wave length. 3 ref.

**6404* Concerning the Tensor of Conductivity of Electron Plasmas in a Constant Magnetic Field.** (French.) Michel Bayet, Jean-Loup Delcroix, and Jean-Francois Denisse. *Comptes rendus*, v. 237, no. 23, Dec. 9, 1953, p. 1503-1505.

Method of Jencel and Kahan must be raised to a higher degree of approximation in order to represent expression of magnetic resistance correctly. 4 ref.

**6405 Instantaneous Multiplier for Computers.** Martin Mehron and Walter Otto. *Electronics*, v. 27, Feb. 1954, p. 144-148.

Cascaded curvature-type balanced modulators perform multiplication of two voltage functions of time and give direct indication of product whether positive or negative. Photographs, diagrams, oscillograms.

**6406 Gain-Stabilized Transistor Amplifier.** Charles A. Krause. *Electronics*, v. 27, Feb. 1954, p. 183-185.

Junction transistor amplifier uses un-bypassed emitter resistor to obtain a predictable, stable gain and wide range of input impedances. Diagrams, table. 3 ref.

**6407 Phase-Selective Detectors.** Curtis R. Schafer. *Electronics*, v. 27, Feb. 1954, p. 188-190, 192.

Half- and full-wave and electro-mechanical circuit diagrams for use in self-balancing bridges, phase discriminators, and a.c. null detectors. Diagrams. 22 ref.

**6408* New Developments in Physics of Semiconductors.** (Russian.) V. E. Lashkarev. *Fizika v Shkole*, v. 13, no. 6, Nov.-Dec. 1953, p. 7-16.

Importance of semiconductors and rectifying and photoelectric properties of Ge and $Ag_2S$ semiconductors are described. Table, diagrams.

**6409 Automatic Impedance-Matching Unit for Liaison Radio Flush-Mounted Aircraft Antenna.** Francis J. Biltz. *Institute of Radio Engineers, Transactions, Professional Group on Aeronautical and Navigational Electronics*, PGAE-9, Sept. 1953, p. 10-19. (TK1 In6.6t)

General problems are discussed briefly before describing specific equipment. Graphs, photographs, diagrams.

**6410 Solution of Linear Differential Equations With Variable Coefficients by the Electronic Differential Analyzer.** Carl E. Howe and Robert M. Howe. *Institute of Radio Engineers, Transactions, Professional Group on Electronic Computers*, v. EC-2, no. 4, Dec. 1953, p. 3-11. (TK1 In6.6t)

A relay device is described which varies resistance in a stepwise continuous manner in order to approximate arbitrary functions of time. Device can be used with electronic differential analyzers to solve linear differential equations with variable coefficients. Diagrams, graphs, table, photograph.

**6411 Accuracy of an Analog Computer.** Lee Cahn. *Institute of Radio Engineers, Transactions, Professional Group on Electronic Computers*, v. EC-2, no. 4, Dec. 1953, p. 12-18. (TK1 In6.6t)

Practical method for determining accuracy required of a general purpose electronic analog computer, justification of method, and basis for evaluation of a computer. Diagrams.

**6412 The Model II Unityper.** Louis D. Wilson and Saul Meyer. *Institute of Radio Engineers, Transactions, Professional Group on Electronic Computers*, v. EC-2, no. 4, Dec. 1953, p. 19-27. (TK1 In6.6t)

Considerations that led designers to develop all-mechanical Model II Unityper. Operational characteristics and relationship of unit to the rest of the computing system are given. Diagrams, photograph.

**6413 A Bibliography of Information Theory Communication Theory—Cybernetics.** F. L. Stumpers. *Institute of Radio Engineers, Transactions, Professional Group on Information Theory*, PGIT-2, Nov. 1953, 60 p. (TK1 In6.6t)

**6414 Electrocardiography as a Problem for Modern Engineering.** Hans E. Hollman. *Institute of Radio Engineers, Transactions, Professional Group on Medical Electronics*, PGME-1, Nov. 1953, p. 1-26. (TK1 In6.6t)

Physiology of the heart under aspect of modern engineering and fundamentals of electrocardiography and its various modifications and perfections. Diagrams, graphs. 14 ref.

**6415 Attenuation in Nickel and Mild-Steel Waveguides at 9,375 Mc/s.** F. A. Benson. *Institution of Electrical Engineers, Proceedings*, v. 101, pt. 3, no. 69, Jan. 1954, p. 38-41.

It is demonstrated that losses in Ni and mild-steel wave guides are quite high because of permeability and surface roughness. Graph. 31 ref.

**6416 Electrical Properties of Selenium. III. Microcrystalline Selenium Metal Doped.** H. W. Henkels and J. Maczuk. *Journal of Applied Physics*, v. 25, Jan. 1954, p. 1-11.

Thermoelectric powers and d.c. and 200-Mc. resistivities of pure and metal doped Se were studied as functions of temperature. Photomicrographs, graphs, tables. 6 ref.

**6417 Space Charge Waves in Inhomogeneous Electron Beams.** Gordon Kent. *Journal of Applied Physics*, v. 25, Jan. 1954, p. 32-41.

Magnetically confined sheet electron beam filling the space between two plane parallel electrodes is discussed. Graphs. 5 ref.

**6418 Some Problems in the Diffusion of Minority Carriers in a Semiconductor.** S. Visvanathan and J. F. Battey. *Journal of Applied Physics*, v. 25, Jan. 1954, p. 99-102.

Solutions to problems in measurement of surface-recombination velocity in a semiconductor. Graph. 3 ref.

**6419 Metal Ultrasonic Delay Lines.** Russell W. Mebs, John H. Darr, and John D. Grimsley. *Journal of Research, National Bureau of Standards*, v. 51, Nov. 1953, p. 209-220.

Discusses applicability of a number of metals and alloys for thermally stable ultrasonic delay lines. Graphs, tables, photographs, diagram, oscillograms, micrographs. 14 ref.

**6420 An Analogue Computer for the Solution of the Radio Refractive-Index Equation.** Walter E. Johnson. *Journal of Research, National Bureau of Standards*, v. 51, Dec. 1953, p. 335-342.

Design considerations and basic circuits are presented. Photograph, graph, table, diagrams. 5 ref.

**6421 The Performance of Dried and Sealed Mica Capacitors.** G. H. Rayner and L. H. Ford. *Journal of Scientific Instruments*, v. 31, Jan. 1954, p. 3-6.

Capacitance and power factor of this capacitor and others have been measured between 10 and 10,000 cycles per sec. for various conditions and are closely correlated. Graphs, tables. 6 ref.

**6422 SEAC Improvements Increase Computing Power.** *National Bureau of Standards, Technical News Bulletin*, v. 38, Jan. 1954, p. 8-13.

NBS Eastern Automatic Computer is an automatic high-speed digital computer operating at a 1-Mc. repetition rate. Machine is predominately serial in nature and uses binary number representation. Photographs, diagrams. 11 ref.

**6423 The Transition From Free to Ambipolar Diffusion.** W. P. Allis and D. J. Rose. *Physical Review*, v. 93, ser. 2, Jan. 1, 1954, p. 84-93.

Spatial distributions of charged particles, space-charge fields, and voltages in gas discharge plasmas in vacuum tubes. Tables, graphs. 4 ref.

**6424 Measurement of Minority Carrier Lifetime and Contact Injection Ratio on Transistor Materials.** A. Many. *Physical Society, Proceedings*, v. 67, no. 409B, Jan. 1954, p. 9-17.

Theory, experimental method, and results. Graphs. 6 ref.

**6425 The Temperature Dependence of the Drift Mobility of Injected Holes in Germanium.** R. Lawrance. *Physical Society, Proceedings*, v. 67, no. 409B, Jan. 1954, p. 18-27.

Effect of trapping on mobility and a suitable trapping model. Graphs, photograph. 13 ref.

**6426 Transistor Control of Magnetic Amplifiers.** G. F. Pittman, Jr. *Radio & Television News*, v. 51, Feb. 1954, p. 13-15, 30-31.

Based on a paper presented at the 1953 National Electronics Conference, Chicago, Ill., Sept. 28-30. Possible application of transistors as control elements in self-saturating amplifiers are investigated. Diagrams, graph, table. 5 ref.

**6427 Diode-Capacitor Memory for Computers.** Arthur W. Holt. *Radio & Television News*, v. 51, Feb. 1954, p. 20, 32-33.

This simple, reliable memory device provides very short access times for high speed computers. Photograph, diagrams.

**6428 The Mathematical Theory of Electrical Discharges in Gases. II. Velocity-Distribution of Positive Ions in a Static Field.** Taro Kihara. *Reviews of Modern Physics*, v. 25, Oct. 1953, p. 844-852.

Stationary velocity distribution, especially drift velocity of ions in a static, homogeneous electric field in the absence of a magnetic field is presented. Graphs, table. 6 ref.

**6429* Introduction to the Study of Semi-Conductors.** (French.) V. Lasareff. *Revue universelle des mines*, v. 9, ser. 9, no. 12, Dec. 1953, p. 789-801.

Dimensions, energy relations, and statistical aspects are emphasized. Graphs, diagrams. 29 ref.

**6430 Stereophonic Tape Recording Equipment.** Russel J. Tinkham. *Society of Motion Picture and Television Engineers, Journal*, v. 62, Jan. 1954, p. 71-74.

Elements and characteristics of two- and three-track recording and reproducing systems are briefly described. Photographs.

**6431 A Bridge Transistor Tester.** David Dorman. *Sylvania Technologist*, v. 7, Jan. 1954, p. 14-19.

Modified vacuum-tube bridge measures four-pole resistances of point contact transistors. Diagrams, table. Photograph.

**6432 Standardization of Printed Circuit Materials.** W. Hannahs, J. Caffiauz, and N. Stein. *Tele-Tech*, v. 13, Feb. 1954, p. 68-70, 150-155.

Lack of technical standards hinder equipment designers as well as plant production and inspection teams. Diagrams, graphs, photographs. 14 ref.

**6433 Precision Transistor Test Equipment.** R. Johnson, D. Humez, and G. Knight, Jr. *Tele-Tech*, v. 13, Feb. 1954, p. 74-75, 179-183.

New instrument indicates d.c. characteristics as well as L. F. a.c. measurements directly on meters. Tables, diagrams.

**6434 FOSDIC—Sensing Device for Computers.** *Tele-Tech*, v. 13, Feb. 1954, p. 78-79, 140.

Optical instrument reads marks on microfilmed documents and automatically processes data for direct input to large-scale computers. Diagrams, photograph.

**6435 Analog Computing by Heat Transfer.** Paul H. Savet. *Tele-Tech*, v. 13, Feb. 1954, p. 101, 122.

New concept in application of heat-electrical transducers permits design of extremely simple units for computers, servo controls, and instrumentation. Diagrams.

**6436* Thermionic Properties of Thoria Layers on Thoriated Molybdenum.** (French.) G. Mesnard. *Vide*, v. 8, nos. 46-47, July-Sept., 1953, p. 1377-1383.

Thermionic emission was studied on bare thoriated Mo and of thoria layers on non-thoriated Mo. Explains effects of medium and high temperature treatment. Graphs. 5 ref.

**6437* Utilization of Cesium Vapor for Production of Thyratron-Type Gas Tubes.** (French.) M. R. Coquerel. *Vide*, v. 8, nos. 46-47, July-Sept., 1953, p. 1384-1391.

Advantages and principal limitations; characteristics of first manufactured tubes; and fabrication peculiarities are described. Table, graphs, photographs, diagrams.

**6438* Thermionic Emission and Optical Emissivity of Zirconium.** (French.) G. Mesnard. *Vide*, v. 8, nos. 46-47, July-Sept., 1953, p. 1392-1399.

Zirconium oxide cathodes were prepared by depositing the oxide on W or Mo wire. Thermionic properties; activation by thermal treatments; and effects of treatments on cathode spectral emissivity, resistance, and heating power are considered. Graphs, table. 4 ref.

**6439* Oscillator Characteristic Equation.** V. L. Talekar. *Wireless Engineer*, v. 31, Jan. 1954, p. 3-6.

Presents theoretical development and experimental verification. Graph. 6 ref.

**6440* H.F. Direction Finding.** S. B. Smith and H. G. Hopkins. *Wireless Engineer*, v. 31, Jan. 1954, p. 11-14.

Compares continuous-wave and pulsed transmissions. Table. 12 ref.

### *Electronics*

**6441* Valve and Receiver Noise Measurement at V.H.F.** N. Houlding. *Wireless Engineer*, v. 31, Jan. 1954, p. 15-26.

Techniques for measurement of noise factor, tube noise, and other parameters required in investigation of receiver noise performance are described. Sources of error and precautions required to minimize them are discussed. Graphs, diagrams, tables. 8 ref.

**6442* Experimental Transistor Receiver.** B. R. Bettridge. *Wireless World*, v. 60, Jan. 1954, p. 2-5.

Description of simple circuit for local station reception. Diagrams, photograph, graph.

**6443* Valve Codes.** M. H. N. Potok. *Wireless World*, v. 60, Jan. 1954, p. 38-40.

Problems of devising a useful and flexible system of tube designations. Table.

**6444* An Instrument for Graphic Determination of Fermi-Energy in Semiconductors.** (German.) Emanuel Mooser. *Zeitschrift für angewandte Mathematik und Physik*, v. 4, no. 6, 1953, p. 433-449.

Computor permits calculations of Fermi-energy as a function of temperature and of quantities characterizing the band-structure. Graphs. 4 ref.

**6445* Influencing the Characteristics of a CsSb Photocathode by Adding Foreign Elements.** (German.) Norbert Schaetti. *Zeitschrift für angewandte Mathematik und Physik*, v. 4, no. 6, 1953, p. 450-459.

Investigations indicated that Cs-Sb and Li-Sb photocathodes showed a delayed emission of electrons after each exposure to light. Graphs, tables. 8 ref.

*Books and Miscellaneous Publications*

**6446 Electron Diffraction.** Z. G. Pinsker. 443 p. 1953. Butterworths Scientific Publications, London. (QC721 P65etr) (Translated from the Russian by J. A. Spink and E. Feigl.)

Deals extensively with theory of electron diffraction and application of method to structure investigations. Extension and practical use of this new method should greatly assist in development of Soviet science and technology to the highest standard, as envisaged in the immense Stalin Post-War Five-Year Plan.

**6447 Servomechanism Analysis.** George J. Thaler and Robert G. Brown. McGraw-Hill Electrical and Electronic Engineering Series. 414 p. 1953. McGraw-Hill, New York. (TJ213 T33s)

General background; LaPlace transformation; equations of physical systems; transient analysis of servomechanisms transfer functions and graphical representation of transfer functions; analysis of servomechanism performance from equations and transfer-function plots; introduction to design; gain adjustment; series and parallel compensation; logarithmic coordinates in analysis and design; relay servomechanisms; and root-locus method are covered in detail.

***See also:***
**6108** (Ge compounds)
**6994** (electronic programming of machine tools)
**7129** (R. F. generator)
**7219** (optical absorption in semi-conductors)

## ENGINEERING ECONOMICS

**6448* A Study of Livestock Marketing in Iowa.** Emil H. Jebe and Norman V. Strand. *Agricultural Economics Research*, v. 6, Jan. 1954, p. 1-9.

General introduction to the problem; sample design and analysis; general information summary of comparisons of respondents and non-respondents to mail survey; farmers' use of marketing information; and changes in marketing intentions. Tables.

**6449* Problems in the Analysis of Food Consumption.** Marguerite C. Burk. *Agricultural Economics Research*, v. 6, Jan. 1954, p. 10-19.

Discusses various measures of food consumption as used by government analyst and information specialist; nutritionists; farm organizations; advertisting agencies; and journalists. Tables. 4 ref.

**6450* Economic Problems of the Horticultural Specialties.** M. Truman Fossum. *Agricultural Economics Research*, v. 6, Jan. 1954, p. 20-26.

Importance of horticultural specialties and problems of business records, marketing, and transportation are discussed.

**6451* Work Simplification Saves $300,000 in Six Years.** W. S. Williams. *American Foundryman*, v. 25, Feb. 1954, p. 54-57.

Work simplification and training of employees to develop methods of doing work in the most simple way have saved Lynchburg Foundry Co. $300,000 in six years. Photographs.

**6452* The Growingest Place—Should You Move?** *Changing Times*, 1954, Feb., p. 7-14.

A statistical comparison of cities and locations. Graphs, tables.

**6453 Sulphuric Acid Output to Capacity.** *Chemical Age*, v. 70, Jan. 9, 1954, p. 165-166.

Rising trend of German chemical sales.

**6454 The Future Demand for Chemicals.** *Chemical Age*, v. 70, Jan. 16, 1954, p. 227-230.

Forecasts for the next quarter century.

**6455 Next Time Use Capitalized Costs.** F. C. Jelen. *Chemical Engineering*, v. 61, Feb. 1954, p. 199-203.

A simple, sound basis for comparing costs of alternatives on a common denominator basis accounts for differences in first cost, operating expense, deferred costs, obsolescence, and salvage value. Tables.

**6456 You Can Cut Maintenance Costs.** Jackson D. Leonard. *Chemical Engineering*, v. 61, Feb. 1954, p. 206-208.

Reasons for high maintenance costs and means of lowering them.

**6457 Evaluate Your Depreciation Charges.** A. M. Hartogensis and H. D. Allen. *Chemical Engineering*, v. 61, Feb. 1954, p. 195-198.

Depreciation, deterioration, and obsolescence are discussed. Knowledge can be applied to specific situations in particular plants. Photographs.

**6458* South African Uranium.** W. Williams. *Chemical & Process Engineering*, v. 35, Jan. 1954, p. 21-22.

Growth of industry and technical details are given.

**6459 Level Year in '53 . . . Better Times Ahead.** *Coal Age*, v. 59, Feb. 1954, p. 76-81.

Reviews economic trends in coal industry. Tables.

**6460* Retrospect and Prospect. II. Raw Materials.** *Engineering*, v. 177, Jan. 8, 1954, p. 42-44.

Trends in non-ferrous metals; new applications of Al; price of iron and steel in Britain; future demand for steel; and steel abroad. Graphs. (To be continued.)

**6461* Suggestions for the Development of Mineral Production in the Northeast.** (Portuguese.) Alberto Ildefonso Erichsen. *Engenharia, mineracao e metalurgia*, v. 18, no. 107, July-Aug. 1953, p. 247-248.

Describes territories in Brazil which are most promising. Advocates creation of a large regional organization to carry out necessary scientific and technical studies. Photographs.

**6462 Business Roundup.** *Fortune*, v. 49, Feb. 1954, p. 25-26, 28, 30, 32.

A monthly report on the economic outlook. Graphs.

**6463* Economic Control of Alloyed Steel Manufacture.** (Czech.) Vl. Keclík. *Hutnické Listy*, v. 9, no. 1, Jan. 1954, p. 24-32.

Compares basic melting methods. Shows expenditures for melting steel from cold-charged metal in various furnaces. Tables. 8 ref.

**6464* The European Trade and Payments System. A Study in Co-Operation.** Robert Marjolin. *Lloyds Bank Review*, 1954, no. 31, Jan., p. 1-15.

Results achieved by organization for European Economic Co-operation. Analyzes difficulties that remain to be overcome.

**6465 More Oil From Known Deposits.** Clyde Williams. *Monthly Business Review*, v. 36, Jan. 1954, p. 8.

New processes have enabled the oil industry to recover fullest potential from known oil deposits.

**6466 Review Forecast.** *Oil and Gas Journal*, v. 52, Jan. 25, 1954, p. 122-159.

Drilling programs; total well and wildcat completions; crude production; proved reserves; total petroleum demand; refinery runs; world production; and natural gas and natural gasoline production. Graphs, tables.

**6467 Record-Breaking Inventories May Mean Lower Realization for Refiners.** John C. Casper. *Oil and Gas Journal*, v. 52, Feb. 8, 1954, p. 58-59.

Includes graphs, photograph, tables.

**6468* The Pattern of Petroleum Product Demand.** M. E. Hubbard. *Petroleum Times*, v. 58, Jan. 22, 1954, p. 56-59.

Past consumption and possible future demands. Graphs.

**6469 Review and Forecast. Construction.** John Peter Flynn. **Cement.** Walter E. Trauffer. **Aggregate Industries.** Kenneth A. Gutschick. **Other Non-Metals.** Kenneth A. Gutschick. *Pit and Quarry*, v. 46, Jan. 1954, p. 99-130.

1953 review of above industries. Photographs, graphs, table.

**6470* Demands for Cement in 1954 Will Approach All-Time Peak.** Bror Nordberg. *Rock Products*, v. 57, Jan. 1954, p. 157-158, 160, 162, 164, 186.

Majority of manufacturers anticipate no decline in volume of business as compared with 1953. Photographs, graphs.

**6471* Concrete Masonry Industry Enters A Competitive Era.** Bror Nordberg. *Rock Products*, v. 57, Jan. 1954, p. 220-225, 238.

Outlook is optimistic provided industry steps up sales activities. Photographs.

**6472* The Southern Pulp and Paper Industry—Past, Present and Future.** D. G. Moon. *Southern Pulp and Paper Manufacturer*, v. 17, Jan. 1954, p. 52, 54, 57-58, 60, 62, 128.

An economic survey. Tables, graphs.

**6473 Still More Steel Expansion Coming as the Population Climbs; 1953's 6.8-Million-Ton Gain Is Just One Step Along the Way.** *Steel*, v. 134, Feb. 8, 1954, p. 78-79.

Data sheet.

*Books and Miscellaneous Publications*

**6474 The Growth of the Major Steel Companies, 1900-1950.** Gertrude G. Schroeder. 244 p. 1953. Johns Hopkins Press, Baltimore. ((HD9511 Sch76g)

A statistical picture of absolute and relative growth of various companies.

***See also:***

**5882** (agricultural trends)
**5983** (review of glass industry)
**6344** (trends in electrical industry)
**6381** (Canadian electrochemical industry)
**6707** (economics of major metals)
**6708** (economics of minor metals)
**6709** (ferro-alloy economics)
**7089** (mining industry as factor in Sweden's economic situation)
**7092** (drilling costs)
**7231** (plastics materials sales increasing)
**7235** (investments in polyethylene industry)

## FLUID MECHANICS

**6475 Heat Transfer and Fluid Friction for Fully Developed Turbulent Flow of Air and Supercritical Water With Variable Fluid Properties.** R. G. Deissler. *ASME, Transactions*, v. 76, Jan. 1954, p. 73-83; disc., p. 83-85.

Substantial agreement was obtained between experimental and analytically predicted heat-transfer and friction correlations as well as velocity and temperature distributions for air. Graphs. 14 ref.

**6476 The Unsteady-Flow Water Tunnel at the Massachusetts Institute of Technology.** J. W. Daily and K. C. Deemer. *ASME, Transactions*, v. 76, Jan. 1954, p. 87-94; disc., p. 94-95.

Investigation of fluid friction and cavitation phenomena in unsteady motion. Diagrams, photographs, graphs. 6 ref.

**6477* Hydrodynamic Stability of the Flow in the Laminar Boundary Layer Between Parallel Streams.** R. C. Lock. *Cambridge Philosophical Society, Proceedings*, v. 50, Jan. 1954, p. 105-124.

Method determines stability of small sinusoidal oscillations in steady laminar flow of a horizontal wind over surface of a liquid at rest. Tables, graphs. 7 ref.

**6478* One-Dimensional Unsteady Motion of a Gas Initially at Rest and the Dam-Break Problem.** A. G. Mackie. *Cambridge Philosophical Society, Proceedings*, v. 50, Jan. 1954, p. 131-138.

One-dimensional unsteady adiabatic motion of a gas which is initially at rest. Graph. 8 ref.

**6479 Pipe-Line Design for Non-Newtonian Fluids.** A. B. Metzner. *Chemical Engineering Progress*, v. 50, Jan. 1954, p. 27-34.

A new and general method for predicting pipe-line pressure-drop requirements for laminar flow of non-Newtonian fluids. Tables, drawing, graphs. 10 ref.

**6480* New Applications of the Similarity Principle.** (German.) F. Schultz-Grunow. *Chemie-Ingenieur-Technik*, v. 26, no. 1, Jan. 1954, p. 18-24.

Applications to theory of flame propagation; rheological liquids; flow of molten glass; flow of liquid steel in the converter; effect of pulsating flow on coal dust combustion; and fuel gas flow during corner burning. Graphs, tables, photographs, diagrams. 13 ref.

**6481 Effect of Gas Slip on Unsteady Flow of Gas Through Porous Media.** J. S. Aronofsky. *Journal of Applied Physics*, v. 25, Jan. 1954, p. 48-53.

Numerical method describes one-dimensional or radial transient flow of gases in which initial and terminal pressures and/or rates are specified. Graphs. 9 ref.

**6482 Vibrations of a Cylindrical Tube Containing Flowing Fluid.** Frithiof I. N. Niordson. *Kungl. Tekniska Högskolans Handlingar* (Transactions of the Royal Institute of Technology, Stockholm, Sweden), 1953, no. 73, p. 3-27. (T4 K96t)

Estimates natural frequencies of several large steel tubes intended to lead water at a velocity of about 7 m. per sec. Table, graphs. 9 ref.

**6483 Investigation at Supersonic Speeds of the Wave Drag of Seven Boattail Bodies of Revolution Designed for Minimum Wave Drag.** August F. Bromm, Jr. and Julia M. Goodwin. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3054, Dec. 1953, 14 p. (TL570 Un3t)

Investigation conducted in Langley 9-inch supersonic tunnel to determine effect of varying Reynolds and Mach numbers on wave drag at zero lift. Graphs, diagram, photograph.

**6484 Transient Temperature Distributions in Simple Conducting Bodies Steadily Heated Through a Laminar Boundary Layer.** Hermon M. Parker. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3058, Dec. 1953, 42 p. (TL570 Un3t)

Analysis of transient heat-conduction effects in flat insulated plate, conical shell, and slender solid cone. Graphs. 7 ref.

**6485 Effect of Surface Roughness Over the Downstream Region of a 23° Conical Diffuser.** Jerome Persh and Bruce M. Bailey. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3066, Jan. 1954, 57 p. (TL570 Un3t)

Air flows used cover an inlet Mach number range from about

## *Fluid Mechanics*

0.10 to 0.40 corresponding to Reynolds numbers of approximately 1 x $10^6$ to 4 x $10^6$ based on inlet diameter. Graphs, table, photograph, diagrams. 5 ref.

**6486 The Temperature Decay Law of a Naturally Conveeted Air Stream.** W. Railston. *Physical Society, Proceedings,* v. 67, no. 409B, Jan. 1954, p. 42-51.

Temperature measurements have been made both vertically and transversely in the plume of air rising by natural convection from an electrically heated gauze in a still atmosphere. Tables, graphs. 6 ref.

**6487* Sewer Pipe Roughness Coefficients.** Kenneth W. Cosens. *Sewage and Industrial Wastes,* v. 26, Jan. 1954, p. 42-50.

Includes graphs, tables, photograph.

**6488 Flow Properties of Strong Shock Waves in Xenon Gas as Determined for Thermal Equilibrium Conditions.** Alexander P. Sabol. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3091, Dec. 1953, 29 p. (TL570 Un3t)

Results of calculations show effects of ionization and electronic excitation on flow properties of one-dimensional shock waves in Xe gas. Photographs, graphs, tables. 9 ref.

**6489 The Resistance to Air Flow of Porous Materials Suitable for Boundary-Layer-Control Applications Using Area Suction.** Robert E. Dannenberg, James A. Weiberg, and Bruno J. Gambucci. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3094, Jan. 1954 21 p. (TL570 Un3t)

Porous, fibrous, and perforated materials were tested. Graphs, photomicrographs, photograph, table. 21 ref.

**6490 Correlations Involving Pressure Fluctuations in Homogeneous Turbulence.** Mahinder S. Uberoi. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3116, Jan. 1954, 61 p. (TL570 Un3t)

Correlations of pressure with itself and with two velocity components were investigated for the case of isotropic turbulence. Graphs, diagram, tables. 23 ref.

**6491 A Method for Estimating the Effect of Turbulent Velocity Fluctuations in the Boundary Layer on Diffuser Total-Pressure-Loss Measurements.** Jerome Persh and Bruce M. Bailey. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3124, Jan. 1954, 16 p. (TL570 Un3t)

Includes graphs. 3 ref.

**6492 The Free-Stream Boundaries of Turbulent Flows.** Stanley Corrsin and Alan L. Kistler. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3133, Jan. 1954, 109 p. (TL570 Un3t)

Experimental and theoretical study of instantaneously sharp and irregular front which is always found to separate turbulent fluid from contiguous "non-turbulent" fluid at a free-stream boundary. Graphs, diagrams, photomicrographs. 43 ref.

**6493 Method for Calculation of Compressible Laminar Boundary Layer With Axial Pressure Gradient and Heat Transfer.** Paul A. Libby and Morris Morduchow. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3157, Jan. 1954, 44 p. (TL570 Un3t)

A rapid and sufficiently accurate method determines laminar-boundary-layer characteristics in flow with a given free-stream Mach number and given velocity distribution at the edge of the boundary layer. Graphs. 23 ref.

*Books and Miscellaneous Publications*

**6494 Flow Properties of Disperse Systems.** J. J. Hermans, editor. 445 p. 1953. North-Holland Publishing Co., Amsterdam. (QC151 H42f)

Includes chapters on "Suspensions", R. Roscoe; "Emulsions", E. G. Richardson; "Gels", J. J. Hermans; "Dilute Solutions of Impenetrable Rigid Particles", Ch. Sadron; "Dilute Solutions of Flexible Chain Molecules", J. J. Hermans; "Liquid Sprays", E. G. Richardson; "Atomization of Liquids", H. L. Green; "Foams", Raphael Matalon; "Smoke", H. L. Green; and "Powders", B. S. Neumann.

**6495 The Dynamics of Thermodynamics of Compressible Fluid Flow.** Ascher H. Shapiro, v. I. 647 p. 1953. Ronald Press Co., New York. (QC151 Sh22d)

Covers one-dimensional gas dynamics, including flow in nozzles and diffusers, normal shocks, frictional flows and flows with heat transfer or energy release; differential equations governing two- and three-dimensional motion of a non-viscous compressible fluid; analytical methods and experimental results for subsonic, two- and three-dimensional flows; two-dimensional supersonic flows from theoretical and practical points of view; and in Appendices, theory of characteristic curves and sets of numerical tables of compressible-flow functions.

## FOOD TECHNOLOGY

**6496* Effect of Temperature and Duration of Storage on Quality of Stored Sweetpotatoes.** J. S. Cooley, L. J. Kushman, and H. F. Smart. *Economic Botany,* v. 8, Jan.-Mar. 1954, p. 21-28.

For six varieties studied, storage temperatures in narrow range of 55 to 60 F were found to be most suitable. Tables. 7 ref.

**6497* A Rapid Method for the Presumptive Identification of Bacteria Which Have Been Associated With Off-Flavors and Odors in Concentrated Orange Juice.** J. M. Berry, J. F. Folinazzo, and D. I. Murdock. *Food Technology,* v. 8, Feb. 1954, p. 70-72.

Method is based upon cell morphology, gram and catalase reactions; relation to oxygen; and growth in sucrose-gelatin. Photographs, table. 13 ref.

**6498* Low Temperature Organisms in Frozen Vegetables.** G. J. Hucker. *Food Technology,* v. 8, Feb. 1954, p. 79-82.

Results of experimental studies. Tables. 9 ref.

**6499* Effect of Oil Treating Shell Eggs on Their Functional Properties After Storage.** E. A. Sauter, Vivian Harns, W. J. Stadelman, and Barbara McLaren. *Food Technology,* v. 8, Feb. 1954, p. 82-85.

Includes tables. 18 ref.

**6500 The Relation of Nitrates in Foods to Tin Plate Container Corrosion.** N. H. Strodtz and R. E. Henry. *Food Technology,* v. 8, Feb. 1954, p. 93-95.

Potential corrosivity of nitrate-containing vegetables toward tin-plate containers is influenced greatly by relatively small changes in pH. Tables, graphs. 4 ref.

**6501* The Effect of Chemical Defoliation on the Quality of Canned Tomatoes.** J. R. Chard, F. J. Francis, and T. O. Graham. *Food Technology,* v. 8, Feb. 1954, p. 95-96.

Practice lowers quality of canned product as judged by color, ascorbic acid content, and percent drained solids. Table. 5 ref.

**6502* Factors Influencing Tenderness of Principal Muscles Composing the Poultry Carcass.** C. H. Koonz, M. I. Darrow, and E. O. Essary. *Food Technology,* v. 8, Feb. 1954, p. 97-100.

Includes photograph, tables, graph. 8 ref.

**6503* Peanut Butter. V. The Effect of Processing and Storage of Peanut Butters on the Stabilities of Their Oils.** R. K. Willich, N. J. Morris, and A. F. Freeman. *Food Technology,* v. 8, Feb. 1954, p. 101-104.

Results of experimental studies. Tables, graphs. 19 ref.

**6504* Frozen Apple Juice Concentrate: Permissible Temperatures for Concentration of Western Varieties of Apples.** L. H. Walker, D. C. Patterson, and V. S. Seamans. *Food Technology,* v. 8, Feb. 1954, p. 108-110.

Investigates causes of flavor changes in juices from varieties of Western apples. Table. 7 ref.

**6505* Observations on Methods to Determine Food Palatability and Comparative Freezing Quality of Certain**

**New Strawberry Varieties.** Elizabeth F. Murphy, Russell M. Bailey, and Mildred R. Covell. *Food Technology*, v. 8, Feb. 1954, p. 113-116.

Texture, color, and flavor of quick-frozen fruits of four strawberry seedlings were evaluated by sensory methods. Tables, graph. 9 ref.

**6506* Storage Changes in Processed Apple Sauce.** G. E. Livingston, W. B. Esselen, and C. R. Fellers. *Food Technology*, v. 8, Feb. 1954, p. 116-120.

Chemical and physical changes in applesauce prepared and stored under different conditions. Graphs, tables. 10 ref.

**6507* Thermal Destruction of Microorganisms and Enzymes. I.** W. B. Esselen and I. J. Pflug. *Glass Packer*, v. 33, Jan. 1954, p. 27-29, 53.

Includes graphs. 22 ref.

**6508 Heatless Sterilization. II.** David M. Ashkenaz. *Glass Packer*, v. 33, Jan. 1954, p. 39, 42, 52.

Includes diagram.

**6509* Food Yeast, Torula Yeast From Potato Starch Wastes.** Castle O. Reiser. *Journal of Agricultural and Food Chemistry*, v. 2, Jan. 20, 1954, p. 70-74.

*Torulopsis utilis* has been grown on protein waste water from potatoes and yields a product with 55% protein. Photographs, tables, graph, diagram. 26 ref.

**6510* Milk Proteins, Effect of Heat Treatment on Serum Proteins.** Robert Jenness. *Journal of Agricultural and Food Chemistry*, v. 2, Jan. 20, 1954, p. 75-81.

Includes graphs, table. 28 ref.

**6511* Antioxidants, New Development for Food Use.** H. R. Kraybill and L. R. Dugan, Jr. *Journal of Agricultural and Food Chemistry*, v. 2, Jan. 20, 1954, p. 81-84.

In addition to preventing loss from impairment of palatability, antioxidants conserve nutritive value of foods and make important contribution to better nutrition and conservation of food supply. 67 ref.

**6512* Factors Affecting the Yield & Quality of Malt Extract From Ragi *(Eleusine coracana)* Malt.** M. R. Chandrasekhara and M. Swaminathan. *Journal of Scientific & Industrial Research*, v. 12, sec. B, Dec. 1953, p. 610-613.

Extract obtained from ragi malt and wheat flour possesses an agreeable flavor and is suitable for preparation of malted milk powder. Tables. 11 ref.

*Books and Miscellaneous Publications*

**6513 Principles of Sugar Technology.** Pieter Honig, editor. 767 p. 1953. Elsevier Publishing Co., Houston, Tex. (TP377 H75p)

Covers physical and chemical properties of sugars and non sugars and purification of technical sugar solutions.

**6514 An Approach to Radiation Sterilization Process Design.** Ernest J. Henley and Elmer L. Gaden, Jr. Paper from CONFERENCE ON NUCLEAR ENGINEERING, 1953 PROCEEDINGS. p. I1-I19. Sept. 9-11, 1953. Univ. of Calif., Berkeley. (QC776 C76p)

Variables affecting destruction of microorganisms by radiation. Graphs, table. 24 ref.

**6515 The Irradiation of Pork to Control Trichinosis.** H. J. Gemberg and S. E. Gould. Paper from CONFERNECE ON NUCLEAR ENGINEERING, 1953 PROCEEDINGS, p. I21-I40. Sept. 9-11, 1953. Univ. of Calif., Berkeley. (QC776 C76p)

Techniques employed and problems involved are discussed. Graphs, photograph, drawings. 15 ref.

***See also:***
**5898** (dairy chemistry)
**5945** (greening of cured meats)
**5947** (food preservation)
**6449** (food consumption analysis problems)

## FUELS AND COMBUSTION

**6516 The Application of Additives to Fuel Oil and Their Use in Steam-Generating Units.** J. B. McIlroy, E. J. Holler, Jr., and R. B. Lee. *ASME, Transactions*, v. 76, Jan. 1954, p. 31-42; disc., p. 43-46.

Addition of high-temperature melting-point compounds to fuel oil generally elevate melting point of aggregate above troublesome temperature level. Diagrams, tables, graphs, photographs.

**6517* The Oiling of Coal.** H. Horsley. *British Steelmaker*, v. 20, Jan. 1954, p. 14-17, 21.

Describes adoption of practice in one plant in order to obtain more stable bulk density and greater uniformity in coal charged into company's coke ovens. Increase of some 5% in output of coke oven plant. Photograph, graph, tables, diagram. 5 ref.

**6518 Investigations Into the Influence of Additions of Sodium Compounds Upon the Process of Semi-Coking of Coals.** M. B. Ravich, V. A. Lanin, and V. I. Korshunov. *Henry Brutcher, Altadena, Cal., Translation no.* 2955, 8 p. (From *Zhurnal Prikladnoi Khimii*, v. 24, no. 9, 1951, p. 970-975.)

Experimental data on relative activities of NaOH, $Na_2CO_3$, and NaCl in catalytic action upon depth of cracking of liquid and gaseous products resulting from semi-coking. Tables, diagram, graph.

**6519* Considerations in the Design of Gas Combustion Systems on Tunnel Kilns Affecting Fuel Economy.** R. G. Legrip. *Ceramics*, v. 5, Dec. 1953, p. 458-469.

Includes diagrams.

**6520 Application of Low-Temperature Carbonization.** Robert E. Zinn. *Chemical Engineering Progress*, v. 50, Jan. 1954, p. 3-7.

Method for upgrading low-grade sub-bituminous and lignite coals. Graph, diagrams, table. 10 ref.

**6521* Segas Process for Making Gas From Oil.** *Engineering*, v. 177, Jan. 8, 1954, p. 52-53.

Process results in daily savings of 60-ton of coal. Photographs, diagram.

**6522 Mechanism of Combustion of Gunpowders and Explosives.** C. H. Johansson. *Engineers' Digest*, v. 15, Jan. 1954, p. 12-14, 36. (Translated from *Teknisk Tidskrift*, v. 83, no. 34, Sept. 22, 1953, p. 695-698.)

Nitrocellulose and types which burn at a controllable rate without detonation are discussed. Graphs. 11 ref.

**6523* Methods of Evaluating the Fusibility of Coal Ashes.** (French.) P. Dumoutet. *Flamme et Thermique*, v. 7, no. 62, Nov. 1953, p. 11-22, 31.

Importance of laboratory method. Graphs, tables, diagram. 13 ref.

**6524* Flame Stability Studies of Different Vaporized Fuels Under Non-Homogeneous Mixing Conditions in a Small Scale Combustion Tube.** J. G. Kirtley and A. Lewis. *Fuel*, v. 33, Jan. 1954, p. 5-19.

Experimental studies using small scale quartz combustion chamber, with heterogeneous air-fuel mixing conditions. Diagrams, graphs, tables.

**6525* Volatilization of Germanium During the Ashing of Coal.** K. V. Aubrey and K. W. Payne. *Fuel*, v. 33, Jan. 1954, p. 20-25.

The Ge content of coal was compared spectrographically with that of the ash prepared under various laboratory conditions. Tables. 6 ref.

**6526* Preliminary Study of the Effects of Atmospheric Oxidation on the Yields of Primary Carbonization Products of Certain Australian Coals.** C. E. Marshall and A. Draycott. *Fuel*, v. 33, Jan. 1954, p. 26-41.

Low and high volatile bituminous coal samples exhibit progressive variations in coke, gas, tar, ammonia, and liquor yields. Photographs, tables, graphs. 12 ref.

## *Fuels and Combustion*

**6527* Reactivity of Cokes to Carbon Dioxide as Measured by Adiabatic Cooling.** H. L. Hou and A. A. Orning. *Fuel*, v. 33, Jan. 1954, p. 42-50.

Includes diagrams, tables, graphs. 12 ref.

**6528* Length of Cylindrical Laminar Diffusion Flames.** J. Barr. *Fuel*, v. 33, Jan. 1954, p. 51-59.

Includes diagrams, tables, graph, photograph. 10 ref.

**6529* Relationship Between Viscosity and Structures of Mineral Oils.** C. Boelhouwer, J. van Steenis, and H. I. Waterman. *Fuel*, v. 33, Jan. 1954, p. 60-65.

Includes graphs, table. 18 ref.

**6530* High-Speed Photography of Spark Ignited, Low Pressure Explosions of Hydrogen-Oxygen and Methane-Oxygen Mixtures.** A. J. Everett and G. J. Minkoff. *Fuel*, v. 33, Jan. 1954, p. 66-78.

Includes graphs, tables, photographs. 16 ref.

**6531* Chemical Structure and Properties of Coal. I. Elementary Composition and Density.** D. W. van Krevelen and H. A. G. Chermin. **II. Reflectance.** F. J. Huntjens and D. W. van Krevelen. *Fuel*, v. 33, Jan. 1954, p. 79-87.

Includes tables, graphs, photographs, diagrams. 15 ref.

**6532* Water Gas From Bituminous Coal Springs Gasworks, S.A.** *Gas Journal*, v. 277, Jan. 13, 1954, p. 95-97.

First gasworks in the British Commonwealth where gas is produced exclusively by gasifying coal in water gas generators. Photographs, diagram.

**6533* A Theory of Vortex Combustion-Chamber Design. II.** H. A. Havemann. *Institute of Fuel, Journal*, v. 27, Jan. 1954, p. 25-34.

Includes graphs, tables. 15 ref.

**6534* Ferrocoke.** A. R. Myhill. *Mechanical World and Engineering Record*, v. 134, Jan. 1954, p. 36-37.

New development produces a coke-iron combination ready for charging into the furnace.

**6535* Graphical Solutions for Power Engineers' Fuel Cost Comparisons.** Paul J. Grogan. *Power Engineering*, v. 58, Jan. 1954, p. 66-67.

Reports method by which two or more fuels of same type, with different heating values and costs, can be compared to determine which is actually more economical. Graph.

**6536* The Nitric Acid Oxidation of Coal. III. Investigation of a Chromatographically Separated Nitrohumic Acid Fraction.** (nEglish.) B. L. van Duuren. *South African Chemical Institute, Journal*, new ser., v. 4, no. 2, Dec. 1951, p. 17-34.

Includes graphs, tables. 9 ref.

**6537* Principles of Design and Operation of Half-Gas Furnaces.** (German.) Karl Kessels and Helmut Kallenbach. *Stahl und Eisen*, v. 73, no. 24, Nov. 19, 1953, p. 1590-1596.

Characteristics and advantages of half-gas firing and operation of billet-heating pusher-type furnace are described. Diagrams, graphs, photograph. 17 ref.

**6538* Thermodynamic Properties of Aniline.** John H. Lienhard, Jr., Joseph L. McCarthy, and William B. Nordquist. *Trend in Engineering, (University of Washington)*, v. 6, Jan. 1954, p. 17-22, 28.

Properties of pressure, volume, temperature, enthalpy, and entropy have been estimated in the gas and liquid phases of aniline between 20 F and 2000 F and at pressures up to 10,000 psi.abs. Tables. 51 ref.

**6539 Report of Research and Technologic Work on Explosives, Explosions, and Flames. Fiscal Years 1951 and 1952.** Bernard Lewis. *U. S. Bureau of Mines, Report of Investigations* 5006, Dec. 1953, 66 p. + 54 plates. (TN21 Un3r)

Includes diagrams, graphs, tables, photographs.

**6540 Distillation Assays of Missouri River Basin Coals.** Manuel Gomez and J. B. Goodman. *U. S. Bureau of Mines, Report of Investigations* 5009, Dec. 1953, 9 p. + 3 plates. (TN21 Un3r)

Experimental work carried out on 18 samples of coal and lignite and laboratory distillation to establish yields on carbonization, chemical analysis before carbonization, and chemical analysis of products of carbonization are described. Tables, graph, diagram, photograph. 8 ref.

**6541* Auto-Oxidation of Hydrocarbon Fuels.** (Russian.) Ia. B. Chertkov and V. N. Zrelov. *Zhurnal Prikladnoi Khimii*, v. 26, no. 10, Oct. 1953, p. 1039-1044.

Rate of oxidation is proportional to hydrocarbon concentration in the fuel. Oxidation products include alcohols and carbonyl compounds. Tables. 4 ref.

***See also:***

**5988** (demands of carbonizing on refractories)
**6480** (flame propagation and coal dust combustion)
**6744** (firing open hearth furnaces)
**6856** (combustion in cupola furnace)

## GEOLOGY AND MINERALOGY

**6542 Structural Relations Among Double Oxides of Trivalent Elements.** M. L. Keith and Rustum Roy. *American Mineralogist*, v. 39, Jan.-Feb. 1954, p. 1-23.

Crystal structures assumed by equimolar and 3:5 molar ratio compounds of sesquioxides are reported. Effect of ionic radius ratio controlling variable. Graphs, tables. 20 ref.

**6543 Unit Cell of Hydromagnesite.** Joseph Murdoch. *American Mineralogist*, v. 39, Jan.-Feb. 1954, p. 24-29.

X-ray study of hydromagnesite crystals confirms monoclinic character of the mineral, but shows that it is pseudo-orthorhombic in structure. Diagrams, tables, graph. 8 ref.

**6544 Study of Orthopyroxenes From Volcanic Rocks.** Hisashi Kuno. *American Mineralogist*, v. 39, Jan.-Feb. 1954, p. 30-46.

Orthopyroxenes from volcanic rocks covering a composition range from bronzite to eulite were studied. Result was compared with properties of orthopyroxenes from plutonic and metamorphic rocks. Tables, graphs. 21 ref.

**6545 Smithsonite From Broken Hill Mine, Rhodesia.** Cornelius S. Hurlbut, Jr. *American Mineralogist*, v. 39, Jan.-Feb. 1954, p. 47-50.

Describes morphology and chemical composition. Drawings, tables. 2 ref.

**6546 Calculation of Polar and Direct Axial Ratios and Polar and Direct Axial Angles of Triclinic Crystals From Interfacial Angles.** George Tunell. *American Mineralogist*, v. 39, Jan.-Feb. 1954, p. 51-62.

Outlines simple and accurate methods. Diagrams. 8 ref.

**6547 Intertracial Angles as Indicators of Optical and Dimensional Orientation of Some Monoclinic Crystals in Random Sections.** E. den Tex. *American Mineralogist*, v. 39, Jan.-Feb. 1954, p. 63-74.

A Universal Stage method constructs location of dominant zone axes in random sections of crystals from orientation of indicatrix and values of apparent dihedral angles as compared with corresponding true angles. Diagrams, photomicrographs. 14 ref.

**6548 The Distribution of Aluminum in the Tetrahedra of Silicates and Aluminates.** Walter Loewenstein. *American Mineralogist*, v. 39, Jan.-Feb. 1954, p. 92-96.

In crystals of silicates and aluminates, distribution of Al in centers of tetrahedra is not entirely at random, but must obey certain restrictions not easily understood on the basis of the Pauling electrostatic valence rule. 13 ref.

**6549 Structural Variations of Some Kaolinites in Relation to Dehydrated Halloysite.** Haydn H. Murray. *American Mineralogist*, v. 39, Jan.-Feb. 1954, p. 97-108.

A selected series of kaolin clay minerals was examined using

X-ray powder diffraction techniques to show structural variations. Graphs, tables. 11 ref.

**6550 Mineralogy of Kaolin Clays From Pugu, Tanganyika.** R. H. S. Robertson, G. W. Brindley, and R. C. Mackenzie. *American Mineralogist*, v. 39, Jan.-Feb. 1954, p. 118-138.

Studies were made by X-ray, thermal, chemical, and electron-optical methods. Tables, graph, micrographs, X-ray powder diagrams, thermograms. 20 ref.

**6551 Note on the Variance in X-Ray Quartz-Powder Diffraction Patterns.** A. F. Gabrysh, E. F. Preece, M. A. Yager, and M. McCutchen. *American Mineralogist*, v. 39, Jan.-Feb. 1954, p. 145-150.

Variance in reflection patterns from the same powdered quartz sample using a rotating thread-like target and a stationary wedge-shaped target. Diagram, table, photographs. 8 ref.

**6552* The Surfaces of Diamonds.** S. Tolansky. *Industrial Diamond Review*, v. 13, Dec. 1953, p. 271-276.

Description of microscopic techniques developed for studying fine surface details on diamonds. Photographs, micrographs. 10 ref.

**6553 Gravity Surveys for Residual Barite Deposits in Missouri.** Robert P. Uhley and LeRoy Scharon. *Mining Engineering*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 199, Jan. 1954, p. 52-56.

Reports of tests investigating accuracy and reliability of method. Maps, charts, table. 6 ref.

**6554 The Brown Iron Ore Resources of Missouri.** Edward L. Clark and Garrett A. Muilenburg. *Mining Engineering*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 199, Jan. 1954, p. 63-66.

Describes character of deposits and ores; geological occurrence and distribution; exploration; mining and beneficiation; and production. Tables, graph, map. 3 ref.

**6555* Iron and Copper Deposits of Mauritania.** (French.) Raymond Furon. *Revue générale des sciences pures et appliquées*, v. 60, nos. 9-10, 1953, p. 262-264.

Cu mine discovered in 1945. Ore contained 3% metallic Cu with a known reserve of about 200,000 tons. Map.

**6556 Lead-Zinc Deposits of the Dunkleberg District, Granite County, Mont.** C. C. Popoff. *U. S. Bureau of Mines, Report of Investigations* 5014, Dec. 1953, 41 p. + 14 plates. (TN21 Un3r)

Various ore deposits in the area and conditions relative to mining of ore. Tables, maps, diagrams.

**6557 Estimate of Known Recoverable Reserves of Coking Coal in Letcher County, Ky.** Joseph J. Wallace, James J. Dowd, Raymond G. Travis, R. F. Abernethy, and D. A. Reynolds. *U. S. Bureau of Mines, Report of Investigations* 5016, Dec. 1953, 26 p. + 13 plates. T(N21 Un3r)

Investigations show two coal beds of major and five beds of minor importance. Tables, maps. 16 ref.

*Books and Miscellaneous Publications*

**6558 Clay Mineralogy.** Ralph E. Grimm. 384 p. 1953. McGraw-Hill. (QE471 G88c)

Summarizes available data on structure, composition, properties, occurence, and mode of origin of various clay minerals whose identities have been reasonably well established. Distribution of clay minerals in rocks of various lithologic types, geologic age, and condition of formation is considered. Analyzes environmental conditions under which individual clay-mineral groups are formed and are stable.

## GEOPHYSICS

**6559 A Case Study of the Dispersion of Energy in Planetary Waves.** Albert V. Carlin. *American Meteorological Society, Bulletin*, v. 34, Sept. 1953, p. 311-318.

Dispersion of energy downstream in mid-tropospheric long-wave pattern during the first two weeks of Nov. 1951. Graphs, charts, tables. 8 ref.

**6560* Problem of Selection of Stars for Correction of Time Pieces.** (Russian.) K. A. Shteins. *Astronomicheskii Zhurnal*, v. 30, no. 5, Sept.-Oct. 1953, p. 540-545.

Clarifies problems of moments in relation to earths' axis. Table, graph. 4 ref.

**6561 Azimuthal Asymmetry of Cosmic Rays in the Stratosphere at the Equator.** S. N. Vernov, A. M. Kulikov, and A. N. Charakhch'yan. *Canada. Defence Scientific Information Service*, no. T38R, Mar. 20, 1953, 6 p. (Translated from *Doklady Akademii Nauk SSSR*, v. 85, no. 3, 1952, p. 525-528.)

Establishes the fact that secondary cosmic rays keep the same direction as primary rays. Table, graphs. 5 ref.

**6562 On the Question of the Identification of the Night Sky Spectrum in the Neighborhood of 10,000 A.** V. I. Krasovski and V. L. Lukashenia. *Canada. Defence Scientific Information Service*, no. T74R, Aug. 15, 1952, 9 p. (Translated from *Doklady Akademii Nauk SSSR*, v. 80, no. 5, 1951, p. 735-738.)

Includes table, spectrographs. 7 ref.

**6563 Interplanetary Matter and the Ionospheric Disturbances Causing Scintillation of Radio Stars.** V. L. Ginzburg. *Canada. Defence Scientific Information Service*, no. T82R, Jan. 24, 1953, 7 p. (Translated from *Doklady Akademii Nauk SSSR*, v. 84, no. 2, 1952, p. 245-248.)

Hypothesis on nature of agency responsible for scintillation of radio stars. Points out possibility of testing this hypothesis by observation of the screening effect of the moon. 6 ref.

**6564 The Ray and Arc Forms of the Aurora.** A. I. Lebedinski. *Canada. Defence Scientific Information Service*, no. T79R, Jan. 20, 1953, 9 p. (Translated from *Doklady Akademii Nauk SSSR*, v. 86, no. 5, 1952, p. 913-916.)

Validity of hypothesis that auroral luminescence was result of direct excitation of molecules in the earth's atmosphere by corpuscles coming from the sun. Graph. 9 ref.

**6565* The Ocean as a Potential Source of World Food Supply.** George A. Reay. *Food Technology*, v. 8, Feb. 1954, p. 65-69.

Discusses marine mammals, fish, and shellfish. 18 ref.

**6566* Geology and Ore Deposits of the Rosario Mining District and the San Juancito Mountains, Honduras, Central America.** Robert H. Carpenter. *Geological Society of America, Bulletin*, v. 65, Jan. 1954, p. 23-38.

Includes diagram, maps. 17 ref.

**6567* Atomic and Molecular Transitions in Auroral Spectra.** Joseph W. Chamberlain and Norman J. Oliver. *Journal of Geophysical Research*, v. 58, Dec. 1953, p. 457-472.

Various transitions were analyzed from standpoint of expected relative intensities of lines or bands originating from common upper levels. Tables, graphs. 25 ref.

**6568* Method of Determining the True Heights of the Layers of the Ionosphere. II. Use of Exact Value of the Refractive Index (Case of Ordinary Radius).** (French.) E. Argence and M. Mayot. *Journal of Geophysical Research*, v. 58, Dec. 1953, p. 493-496.

Determination of characteristic parameters of an ionized layer by hypothesis that variation of electronic density ensues from a parabolic law. Table. 2 ref.

**6569* On a Self-Exciting Process in Magneto-Hydrodynamics.** Hitoshi Takeuchi and Yasuo Shimazu. *Journal of Geophysical Research*, v. 58, Dec. 1953, p. 497-518.

Considers whether magneto-hydrodynamical equations have a solution representing self-exciting process appropriate to convection-current model proposed by E. C. Bullard. Diagrams, tables. 9 ref.

**6570* A Series of Startospheric Temperature Profiles Obtained With the Searchlight Technique.** L. Elterman. *Journal of Geophysical Research*, v. 58, Dec. 1953, p. 519-530.

Measurements of atmospheric densities using improved instrumentation. Photographs, graphs, tables. 3 ref.

### *Geophysics*

**6571* On the Production of Glow Discharges in the Ionosphere by Winds.** Oliver R. Wulf. *Journal of Geophysical Research*, v. 58, Dec. 1953, p. 531-538.

Source of excitation of airglow and aurora is to be found in potential differences generated by zonal ionospheric winds cutting the earth's magnetic field. Diagrams. 24 ref.

**6572* The Troposphere as a Medium for the Propagation of Radio Waves. I.** H. Bremmer. *Philips Technical Review*, v. 15, Nov. 1953, p. 148-159.

Troposphere in relation to radio transmission whereby radio communication can be made using microwaves. Diagrams. 12 ref.

**6573* Recent Advances in Science: Meteorology.** F. H. Ludlam. *Science Progress*, v. 42, Jan. 1954, p. 65-75.

Nature, composition, and deposition of atmospheric aerosols. Graph, tables. 20 ref.

**6574 Rockets and the Upper Atmosphere.** Homer E. Newell, Jr. *Scientific Monthly*, v. 78, Jan. 1954, p. 30-36.

Contributions of the rocket to knowledge of upper air physics. Spectrograms, graphs. 17 ref.

*Books and Miscellaneous Publications*

**6575 Meteorological Instruments.** W. E. Knowles Middleton and Athelstan F. Spilhuns. 3rd Rev. Ed. 286 p. 1953. Univ. of Toronto Press, Canada. (QC876 M58m3)

Covers properties of meteorological instruments; measurement of atmospheric pressure, temperature in meteorology, atmospheric humidity, precipitation and evaporation, wind near the surface, and upper winds by means of pilot balloons; instruments for investigating clouds; sunshine recorders; instruments for investigation of the upper air; and special meteorological assemblies and systems.

***See also:***
**5856** (guided missiles for atmospheric research)

## GRAPHIC ARTS

**6576* Pressroom Equipment and Techniques.** Olin F. Freedman. *American Pressman*, v. 64, Jan. 1954, p. 20, 24, 42, 44-46, 48.

Forecasts future trends in the industry.

**6577* Photography for a Clearer Picture of Engineering Drawings.** *Industrial Photography*, v. 3, Jan. 1954, p. 34-35, 82.

Photographs can be used in place of engineering drawings in many instances, with considerable savings resulting in time and money. Photographs.

**6578* Academic Lithography. I.** Haviland F. Reves. *Modern Lithography*, v. 22, Jan. 1954, p. 32-34, 113, 115.

Production, methods, and historical background of textbook publishers. Photographs. (To be continued.)

**6579* Varnishing by Roll Coating. Basic Principles of Application.** H. Audino. *Modern Lithography*, v. 22, Jan. 1954, p. 37-41, 109, 111.

Chambers and Christensen roll coating machines. Diagrams, photographs.

**6580* Some Thoughts on Plate Lacquers.** Grant C. Beutner. *Modern Lithography*, v. 22, Jan. 1954, p. 48-50.

Discusses lacquers using various vinyl resins as bases.

**6581* Control Instruments for Offset Lithography. IV. Glossometers, Ink Control Instruments, and Paper Control Instruments.** Henry R. Long. *National Lithographer*, v. 61, Jan. 1954, p. 26-29.

**6582* Cause and Correction of Difficulties With Offset Papers.** William Beckett. *National Lithographer*, v. 61, Jan. 1954, p. 40-42.

Properties of paper which cause it to expand or contract. Conditions in which paper is printed can be controlled to prevent changes of dimension from becoming so large as to affect register.

**6583* Problems of Multi-Layer Film Construction.** J. E. Bates and F. H. Gerhardt. *Photographic Engineering*, v. 4, no. 4, 1953, p. 197-205.

Light losses, developer penetration rates, and inter-layer processing and adjacency effects. Graphs, diagram. 4 ref.

**6584* A Magnetic Fluid Clutch Streak Camera.** I. J. Taylor. *Photographic Engineering*, v. 4, no. 4, 1953, p. 206-213.

Difficulties encountered in measurement of explosive forces. Extremely fast accelerating film drive mechanism for use in photographic instrumentation. Photographs, diagrams.

**6585* Diffusion Transfer Processes as Applied to Photocopying.** T. T. Hill. *Photographic Engineering*, v. 4, no. 4, 1953, p. 214-219.

More than one copy can be made from an original negative. Improved permanency is possible in the positive print. 37 ref.

**6586* An Appraisal of Drying Systems.** Oscar Fisher. *Photographic Engineering*, v. 4, no. 4, 1953, p. 226-230.

Phases and phychometry fundamentals involved in drying photographic films are discussed. Graph. 2 ref.

**6587* Some Properties and Monobath Developers.** R. G. Clarke, C. E. Milner, Jr., and J. Gomez-Ibanez. *Photographic Engineering*, v. 4, no. 4, 1953, p. 231-235.

Comparative data for mono-bath and standard developers. Graphs, tables. 6 ref.

**6588* Photographic Engineering: A Survey of the Literature.** Frank Smith. *Photographic Engineering*, v. 4, no. 4, 1953, p. 236-239.

Photographic literature published during 1951-53 is surveyed. 24 ref.

**6589* Paper Properties as Related to Printability. III.** William H. Bureau. *Printing Equipment Engineer*, v. 84, Jan. 1954, p. 30-32.

Includes photograph.

**6590* The ABC of Offset. XVIII. Chemistry and Chemicals.** George Jos. Lenzer. *Printing Equipment Engineer*, v. 84, Jan. 1954, p. 33, 36-37.

Brief outline of fundamentals and principles of chemistry and chemicals in offset. Photographs. (To be continued.)

**6591* Glycerine in the Printing Industry.** E. Scott Pattison. *Printing Equipment Engineer*, v. 84, Jan. 1954, p. 37-40.

Because of its chemical configuration, glycerine can enter into ester gums and alkyd resins. Photographs. 15 ref.

**6592 The Laboratories of Ilford Limited.** G. B. Harrison. *Royal Society, Proceedings*, v. 220, ser. A, Dec. 22, 1953, p. 423-434 + 4 plates.

Production of light sensitive photographic materials based on sensitivity of Ag halides to light at blue and violet end of visible spectrum. Graph.

**6593 Development of Motion-Picture Positive Film by Vanadous Ion.** A. A. Rasch and J. I. Crabtree. *Society of Motion Picture and Television Engineers, Journal*, v. 62, Jan. 1954, p. 1-10; disc., p. 10.

Inorganic developer system of Roman, employing divalent V-ion as active developing agent, has been further investigated. Graphs, photographs, diagram, table. 8 ref.

**6594 A Mathematical Approach to Replenishment Techniques.** Samuel R. Goldwasser. *Society of Motion Picture and Television Engineers, Journal*, v. 62, Jan. 1954, p. 11-23; disc., p. 23.

Equations are derived for use in calculating formulas and rates of addition of replenisher solutions. Diagrams. 5 ref.

**6595 The Effect of Camera Exposure on the Tone-Reproduction Quality of Motion Pictures.** Allan L. Sorem. *Society of Motion Picture and Television Engineers, Journal*, v. 62, Jan. 1954, p. 24-42; disc., p. 42-44.

Describes method for obtaining psychometric data. Curves show relationship between screen image quality and logarithm of camera exposure. Graphs, tables, photographs.

**6596 Photoflash Lamps.** Lester F. Anderson. *Sylvania Technologist*, v. 7, Jan. 1954, p. 8-13.
Early development of photoflash lamps and progress of last 25 years is discussed. Graphs, photograph, diagram.

*See also:*
**6265** (lithographic coating process)
**6600** (photography in engine cylinders)

## HEAT POWER

**6597 Performance of Free-Piston Gas Generators.** J. J. McMullen and W. G. Payne. *ASME, Transactions*, v. 76, Jan. 1954, p. 1-10; disc., p. 10-13.
Rapid development of this type generator power plant. Original Pescara unit in France, and Cooper-Bessemer and Baldwin-Lima-Hamilton generators being perfected in the United States. Graphs, diagrams, tables, drawings. 9 ref.

**6598 The Free-Piston Type of Gas-Turbine Plant and Applications.** J. J. McMullen and R. P. Ramsey. *ASME, Transactions*, v. 76, Jan. 1954, p. 15-17; disc., p. 27-29.
Latent possibilities in heavy-duty free-piston machinery. Photographs, graphs, diagrams, tables.

**6599 An Interferometric Study of the Boundary Layer on a Turbine Nozzle Blade.** C. R. Faulders. *ASME, Transactions*, v. 76, Jan. 1954, p. 61-66; disc., p. 67.
Includes graphs, photographs, diagrams. 11 ref.

**6600 A Photographic Study of Events in a 14-In. Two-Cycle Gas-Engine Cylinder.** R. L. Boyer, D. R. Craig, and C. D. Miller. *ASME, Transactions*, v. 76, Jan. 1954, p. 97-106; disc., p. 106-108.
Experimnetal studies in ignition, flame propagation, fuel injection, exhaust blowdown, cylinder scavenging, and turbulence in a Cooper-Bessemer GVM engine. Photographs, diagrams.

**6601* Factory Power Engineering. Some Present Trends and Future Possibilities.** John Fox. *Claycraft*, v. 27, Jan. 1954, p. 189-194.
Includes tables, graph, diagram. (To be continued.)

**6602 The Controlled-Circulation Boiler.** W. H. Armacost. *Combustion*, v. 25, Jan. 1954, p. 38-44.
Excerpts from a paper presented at 1953 ASME Annual Meeting. Discusses factors which made development possible. Diagrams, photograph, graphs, table.

**6603* Diesel Engine Prospects for 1954.** Peter B. B. Andrews. *Diesel Power*, v. 32, Jan. 1954, p. 38-42.
Survey of what the diesel industry might expect in 1954.

**6604* A Look at Turbocharging.** Rudolph Birmann. *Diesel Power*, v. 32, Jan. 1954, p. 80-87.
Turbocharger-engine combinations and systems along with their application and effects on engine performance are presented. Diagrams, graphs.

**6605* Gas Engine Using Natural Gas.** (Russian.) A. I. Shatilov. *Energeticheskii Biulleten*, 1953, no. 11, Nov., p. 18-23.
New 45 hp., 750 r.p.m. internal combustion engine. Diagrams, tables.

**6606* High Temperature Turbine Machinery for Marine Propulsion. I. Steam Turbines.** T. W. F. Brown. *Engineer*, v. 197, Jan. 22, 1954, p. 122-127.
Possibilities of future development. Diagrams, tables, graphs. (To be continued.)

**6607* The Physical Nature of "Knock".** Boris N. Cole. *Engineering*, v. 177, Jan. 22, 1954, p. 111-115.
High transient pressures and temperatures are actual instruments of damage in a "knocking" engine. Graph, table, diagram.

**6608* History, Types, Operations, Parts of Jet Engines.** William F. Schleicher. *Machine and Tool Blue Book*, v. 49, Jan. 1954, p. 147-156, 158.
A background and thorough examination of the jet engine. Diagrams, photographs. 2 ref.

**6609* Experiences During the Last Ten Years in the Design of Marine Boilers.** R. L. J. Hayden. *North East Coast Institution of Engineers & Shipbuilders, Transactions*, v. 70, Jan. 1954, p. 151-192.
Operating experiences with each part of the generating unit such as furnace, boiler, superheater, economizer, and airheater are described. Tables, diagrams, photographs.

**6610* Design Boiler and Furnace for Spreader Stoker Firing.** L. H. Coykendall and P. R. Loughin. *Plant*, v. 9, Feb. 1954, p. 45-48.
Tests were made on heat release, gas temperatures, amounts of flue dust, and efficiency. Diagrams, graph. 3 ref.

**6611* Power Engineers Take Long Step to 4500-psi, 1150 F Steam.** Chester R. Earle. *Power Engineering*, v. 58, Jan. 1954, p. 58-61.
Discusses implications of building power plants capable of supercritical steam pressures. Diagrams, photographs.

**6612* Gas Turbines and the Motive-Power Problem.** P. A. McGee. *Railway Locomotives and Cars*, v. 128, Feb. 1954, p. 47-51, 61.
Analysis of locomotive power and performance requirements of units in service with special reference to gas turbine. Tables, graphs.

**6613 The Production and Measurement of Surge-Ignition Sparks.** J. Kenneth Richmond and A. L. Furno. *Review of Scientific Instruments*, v. 24, Dec. 1953, p. 1107-1112.
Duraton, energy content, and wave shape of these sparks have been measured and studied to determine effect on ignition process. Photograph, diagram, oscillograms, graphs. 12 ref.

**6614* Foaming and Aeration of Oils in Aviation Powerplant.** R. Tourret. *Royal Aeronautical Society, Journal*, v. 58, Jan. 1954, p. 53-60.
Surveys knowledge of oil foaming. Reciprocating engines are the main consideration. Graphs, diagrams. 31 ref.

**6615* Slagging of Gas Turbine Plants From Ashes of Fuels and Resulting Corrosion of Materials.** (German.) J. Biert and R. Scheidegger. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 19, no. 12, Dec. 1953, p. 359-366.
Discusses gas-flow disturbance, reduced efficiency, and corrosion of heat resistant steel. Table, graph, diagram, photographs. 6 ref.

**6616 Use of Electric Analogs for Caluculation of Temperature Distribution of Cooled Turbine Blades.** Herman H. Ellerbrock, Jr., Eugene F. Schum, and Alfred J. Nachtigall. *U. S. Advisory Committee for Aeronautics, Technical Note* 3060, Dec. 1953, 116. (TL570 Un3t)
Investigation to develop simple, inexpensive electric analogs for determining temperatures of cooled turbine blades. Diagrams, graphs, tables, photographs. 28 ref.

*See also:*
**6295** (ash deposition in gas turbines)
**6323** (corrosion in diesel cylinders)
**6993** (metallurgical requirements of gas turbines)

## INFORMATION—PREPARATION AND DISSEMINATION

**6617 Electronic Data Processing.** Ira H. Abbott. *Machine Design*, v. 26, Jan. 1954, p. 226, 228, 230, 232, 234, 236.
Taken from "Methods Used by NACA for Data Reduction" presented at Rome AGARD Conference, Dec. 1952. Computing machines and semi-automatic and automatic processing.

*See also:*
**6082** (literature problems in analytical chemistry)

## INSTRUMENTATION AND LABORATORY APPARATUS

**6618 The Uncompensated Pendulum Clock.** Laurence E. Dodd. *American Journal of Physics*, v. 22, Jan. 1954, p. 9-12.
Effect of thermal expansion on clock accuracy. Table. 17 ref.

## *Instrumentation and Laboratory Apparatus*

**6619* A Flex Tension Test for Leather.** T. J. Carter and J. R. Kanagy. *American Leather Chemists' Association, Journal,* v. 49, Jan. 1954, p. 23-42.

Machine based on flexing under tension may be used to detect differences in leathers caused by tannage, lubrication, accelerated aging, and deterioration. Tables, diagrams, graphs. 6 ref.

**6620* Efficiency Studies of the Electrostatic Precipitator.** Kenneth E. Lauterbach, Thomas T. Mercer, Alastair D. Hayes, and Paul E. Morrow. *Archives of Industrial Hygiene and Occupational Medicine,* v. 9, Jan. 1954, p. 69-75.

Tests in collecting a radioactive aerosol show that the instrument retains a uniformly high percentage of air-borne particulate material. Method gave ducible results in estimating penetration values as low as 0.005%. Tables, diagram, photograph. 6 ref.

**6621 The Preparation and Use of Cells for the Realization of the Triple Point of Water.** C. R. Barber, R. Handley, and E. F. G. Herington. *British Journal of Applied Physics,* v. 5, Jan. 1954, p. 41-44.

Techniques and experimental data. Graphs, diagrams. 15 ref.

**6622 The Ultrasonic Microscope.** S. Ya. Sokolov. *Henry Brutcher, Altadena, Cal., Translation* no. 3003, 5 p. (From *Doklady Akademii Nauk SSSR,* v. 64, no. 3, 1949, p. 333-335.)

Ultrasonic microscope by which extremely small objects and non-uniformities in optically transparent and opaque media can be observed. Diagram, photograph.

**6623 Basic Instrumentation at National Bureau of Standards.** *Ceramic Age,* v. 63, Jan. 1954, p. 22-25.

Program of research in which new applications of physical principles are evaluated and applied to problems in measurement and control. Photographs. 13 ref.

**6624 A Scanning Device for Determining the Size Distribution of Spray Droplet Images.** C. R. Adler, A. M. Mark, W. R. Marshall, Jr., and R. J. Parent. *Chemical Engineering Progress,* v. 50, Jan. 1954, p. 14-23.

Instrument utilizes a scanning technique to count and classify spray droplet images on photographic negatives. Diagrams, photographs, tables, graphs. 7 ref.

**6625* The Photodianode.** (French.) George Deloffre, Émile Pierre, and Jean Roig. *Comptes rendus,* v. 237, no. 23, Dec. 9, 1953, p. 1507-1509.

Instrument consists of a plane cathode and two rectilinear anodes in parallel with the cathode. Measures very small displacements and rotations with precision. Diagrams, graphs.

**6626* New Odorometer Shows Good Results.** A. F. Cascioli and R. L. Coryell. *Gas Age,* v. 113, Jan. 28, 1954, p. 9-10, 52.

Tests under various field conditions give consistent results, both from impressions obtained by various observers, and by correlation with results of chemical tests. Diagram, photographs.

**6627* NBS Has Program of Research and Development in Basic Instrumentation.** *Industrial Gas,* v. 32, Jan. 1954, p. 8-9, 23-24.

Covers surveys of available instruments and techniques; projects for evaluation of new applications to general and specific problems; and specialized projects. Photographs. 8 ref.

**6628 A Radio-Frequency Permeameter.** Peter H. Haas. *Journal of Research, National Bureau of Standards,* v. 51, Nov. 1953, p. 221-228.

Instrument is capable of measuring permeability and losses in ferromagnetic toroidal cores. Diagrams. 5 ref.

**6629 An Electromagnetic Method of Measurement of Density or Specific Gravity of Liquids.** K. R. Honick. *Journal of Scientific Instruments,* v. 31, Jan. 1954, p. 1-2.

Instrument determines specific gravity by measuring minimum electromagnetic force in terms of current required to attract an immersed float through a fixed distance. Diagrams.

**6630 Liquid Manometers With High Sensitivity and Small Time-Lag.** F. A. MacMillan. *Journal of Scientific Instruments,* v. 31, Jan. 1954, p. 17-20.

Problems in design and general principles. Diagram.

**6631 Determining Weight Electronically.** Verne C. Kennedy. *Mechanical Engineering,* v. 76, Feb. 1954, p. 159-165.

Discusses three basic elements, load cells, servosystem, and data-presentation device. Photographs, diagrams.

**6632 Highly Sensitive Dilatometer.** *Metal Progress,* v. 65, Feb. 1954, p. 202, 204, 206, 208. (Digest of "Improved Precision Equipment for Metallurgical Analysis. I. Differential Transformer Dilatometer", L. L. Wyman, U. S. Atomic Energy Commission Report KAPL-654.)

Experimental work in instrumentation.

**6633* A Photoelectric X-Ray Sensitometer.** E. T. Larson. *Photographic Engineering,* v. 4, no. 4, 1953, p. 220-225.

Instrument for evaluation of sensitometric properties of medical X-rays films under conditions which approximate those used in practice. Diagrams, graphs, table, photograph.

**6634 Radio-Carbon Dating by a Proportional Counter Filled With Carbondioxide.** (English.) H1. De Vries and G. W. Barendsen. *Physica,* v. 19, no. 10, Oct. 1953, p. 987-1003.

Technique for measurement of natural activity of 14 carbon. Characteristics of counter are discussed. Diagrams, graphs. 15 ref.

**6635 Development of a Proton Scintillation Spectrometer.** (English.) F. P. G. Valckx and P. M. Endt. *Physica,* v. 19, no. 11, Nov. 1953, p. 1140-1142.

Mounting obviates crystal deterioration. Diagram, graph.

**6636 The Design and Operation of a Double Magnetic Lens Beta-Ray Spectrometer.** G. P. Rundle, J. Ellis, T. C. Griffith, and H. S. Tomlinson. *Physical Society, Proceedings,* v. 67, no. 409B, Jan. 1954, p. 52-64.

This spectrometer has a much lower spherical aberration than a short lens and gives a performance comparing not unfavorably with long lens types. Diagrams, graphs. 23 ref.

**6637 Low-Temperature X-Ray Goniometer for Structural Studies of Crystal Transitions.** R. Keeling, B. C. Frazer, and R. Pepinsky. *Review of Scintific Instruments,* v. 24, Dec. 1953, p. 1087-1095.

Instrument has been designed for use with a camera or a Geiger counter system. Diagrams, photographs.

**6638 An Anticoincidence Gamma-Ray Scintillation Spectrometer.** Richard D. Albert. *Review of Scientific Instruments,* v. 24, Dec. 1953, p. 1096-1101.

Designed to suppress signals arising from incident photons that are not completely absorbed in the primary detecting NaI(T1) crystal. Oscillograms, diagram, graphs. 18 ref.

**6639 Electric Hygrometer of Small Dimensions.** W. A. Brastad and L. F. Borchardt. *Review of Scientific Instruments,* v. 24, Dec. 1953, p. 1143-1144.

Relative humidities associated with surfaces as small as 0.001 square inch were measured. Diagrams, photographs, graph.

**6640* A Specimen Holder for Low-Temperature Microscopy in Biology.** J. R. Harmer. *Royal Microscopical Society, Journal,* v. 73, ser. 3, Dec. 1953, p. 128-133.

Factors influencing quality of images obtained and further modifications are discussed. Diagram, graph. 7 ref.

**6641 Self-Temperature-Compensating SR-4 Strain Gages.** R. S. Barker. *Society for Experimental Stress Analysis, Proceedings,* v. 11, 1953, p. 119-128.

Description of gages, test procedure, and test results. Graphs. 3 ref.

**6642 Two Machines for Combined Bending and Torsion Fatigue.** W. N. Findley and W. I. Mitchell. *Society for Ex-*

*perimental Stress Analysis, Proceedings*, v. 11, 1953, p. 203-212.

Design and features of apparatus to convert Krouse plate-bending fatigue machines and Sonntag vibratory fatigue machines for use in tests under combined bending and torsion are described. Graphs, photographs. 4 ref.

**6643 Machine for Static and Dynamic Testing of Slabs.** W. M. Wells, Jr. and R. J. Hansen. *Society for Experimental Stress Analysis, Proceedings*, v. 11, 1953, p. 213-220.

Design and construction of testing machine. Diagrams, graphs, photograph.

**6644 Recording Interferometer for Strain Gage Calibration.** A. S. Kobayashi and E. E. Day. *Society for Experimental Stress Analysis, Proceedings*, v. 11, 1953, p. 235-238.

Includes photographs, diagram, graph.

**6645 An Apparatus for Determining Galling Characteristics and Measuring Coefficients of Kinetic Friction.** W. C. Leone and F. F. Ling. *Society for Experimental Stress Analysis, Proceedings*, v. 11, 1953, p. 239-248.

Apparatus for making a study of friction and galling characteristics of metals. Graphs, photographs, diagram, table.

**6646* ORNL Group Develops X-Ray Camera for Studying Materials at 4000° F.** *Southern Chemical Industry*, v. 6, Jan.-Feb. 1954, p. 16.

Diffraction patterns of oxides and metals have been produced.

**6647* Experiences With Immersion Thermocouples.** (German.) Gerhard Eichert. *Stahl und Eisen*, v. 74, no. 2, Jan. 14, 1954, p. 95-98.

Laboratory and plant experiences with operation between 1000 and 1700 C and comparative temperature measurements of alloyed and unalloyed steel melts made with immersion thermocouple and color pyrometer. Diagrams, graphs, photographs.

**6648* Controlling Visual Characteristics on Precision Parts.** Aldis S. Hayes. *Tooling and Production*, v. 19, Nov. 1953, p. 94-97, 100.

Elimination of human error as an advantage in measurement.

**6649 A Photographic Method for Determining Vertical Velocities of Aircraft Immediately Prior to Landing.** Emanuel Rind. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3050, Jan. 1954, 23 p. (TL570 Un3t)

Method employs a long-focal-length (40-inch) lens developed for use with land-based airplanes. It requires no instrument installation on aircraft or interference with airport operation. Employs relatively simple data reduction. Graphs, photographs. 6 ref.

**6650* The Magnetic Oxygen Analyzer in Studies of Oxygen Uptake.** Sam R. Hoover, Lenore Jasewicz, and Mandor Porges. *Water & Sewage Works*, v. 101, Feb. 1954, p. 81-83.

Instrument measuring aerobic oxidation rates. Graphs, photographs, table.

*Books and Miscellaneous Publications*

**6651 The Instrument Manuel.** 2nd Ed. 628 p. 1953. Union Trade Press, Ltd., London. (QC185 In6.6)

Covers engineering precision instruments and gauges; instruments for determining physical and mechanical properties; optical instruments; instruments for the determination of texture and determination of compositional quality; measurement and control of time and speed; measurement and proportioning of weight; measurement and control of pressure and vacuum, liquid level depth, and volume, specific gravity of liquids, and of temperature; measurement of fluid flow; hydrogen ion concentration, and control of humidity and dew point; automatic control; electrical measuring, general electronic, aeronautical, navigational, meteorological, and surveying instruments; measurement and control of conductivity; telemetering; measurement of viscosity; nucleonic instruments; organizations and publications interested in instrumentation; and an alphabetical list of manufacturers.

**6652 Precision Measurement of Magnetic Induction With Bismuth Wire.** H. B. Keller. Paper from CONFERENCE ON NUCLEAR ENGINEERING, 1953 PROCEEDINGS. p. H55-H69. Sept. 9-11, 1953. Univ. of Calif., Berkeley. (QC776 C76p)

Resistance-gauss effect exhibited by Bi was usd to construct a laboratory instrument. Table, photographs, diagrams. 14 ref.

***See also:***

**6072** (refinery instrumentation)
**6269** (instruments for testing organic coatings)
**6312** (interferometer for corrosion measurements)
**6337** (electric pipe network analyzer)
**6355** (measurement of electromagnetic power)
**6431** (transistor tester)
**6575** (meteorological instruments)
**6669** (ball bearing for instruments)
**6869** (temperature measuring instruments)
**6931** (apparatus for determination of magnetic anisotropy)
**6942** (strain gages)
**7105** (counting tube for X-rays)
**7151** (scintillation counter)
**7160** ($\beta$-ray microscope)
**7226** (mass spectrometer)
**7267** (pollution indicator)
**7331** (theory of thermocouples)
**7376** (moisture meter)

## LUBRICATION AND FRICTION

**6653 Wax Lubricants in Metal Working.** James B. Carse, A. E. Budner, and George L. Boehm. *American Society of Tool Engineers, Technical Papers and Panel Discussion*, v. 21, 1953, 19 p.

Classifications and typical examples. Tables.

**6654* Some Problems With Compressor Lubrication.** *Lubrication*, v. 40, Jan. 1954, p. 1-16.

Selection and application of lubricants and importance of design, installation, and operation of compressor units. Diagrams, tables, graph, photographs.

**6655* Lubricants Aid Abrasive-Belt Grinding and Polishing.** Jack Durnan. *Machinery*, v. 60, Feb. 1954, p. 173-176.

Factors affecting selection of lubricant and advantages of each. Photographs.

**6656* Unusual Lubricants.** *Mechanical World and Engineering Record*, v. 134, Jan. 1954, p. 6.

Compares principal features of phosphate coatings, $MoS_2$, and silicone greases. Discusses characteristic applications in each case.

**6657 Many Tests Show Qualities of Engine Lubricating Oils. II.** W. A. Gruse. *Petroleum Engineer*, v. 26, Jan. 1954, p. C9-C10, C12, C14.

Some properties can be determined comparatively by empirical tests. Others require actual operating tests. Photographs.

**6658* Here Are More Details on Chain Drive Lubrication.** A. F. Brewer. *Power Engineering*, v. 58, Jan. 1954, p. 83-84.

Discusses considerations in selecting most effective lubricant for each type of drive. Diagrams, photograph.

**6659* Lubrication of Gears. I.** *Scientific Lubrication*, v. 6, Jan. 1954, p. 13-17.

Purpose of this article is to help the Lubrication and Plant Engineer to diagnose gear failures that are caused, or helped, by imperfect lubrication. Diagrams, graphs. (To be continued).

**6660* Lubrication of Non-Metallic Bearings and Gears.** A. E. Williams. *Scientific Lubrication*, v. 6, Jan. 1954, p. 20-24.

Includes photographs, diagram.

**6661 Friction and Wear Investigation of Molybdenum Disulfide. I. Effect of Moisture.** Marshall B. Peterson and Robert L. Johnson. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3055, Dec. 1953, 28 p. (TL570 Un3t)

Studies were conducted with a low-speed kinetic-friction apparatus to clarify role of moisture, shear area, and surface finish. Graphs, photomicrographs, diagrams. 11 ref.

### *Lubrication and Friction*

**6662 Lubricants of Reduced Flammability.** Charles E. Frank, Donald E. Swarts, and Kenneth T. Mecklenborg. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3117, Jan. 1954, 24 p. (TL570 Un3t)

Studies on spontaneous ignition of lubricants and potential lubricants; emphasis placed on hydrogenated polyisobutylenes; preparation and properties of different blends. Tables, graphs. 5 ref.

**6663* High Temperature Lubrication.** *Western Machinery and Steel World,* v. 45, Jan. 1954, p. 102-104.

Types of lubricants and specifications. Photographs.

***See also:***
**6917** (metal wear)
**7234** (plastic bearings)

## MECHANICAL ENGINEERING

**6664 Correlation of Metallurgy With Engineering Design.** R. C. Gibbons. *American Society of Tool Engineers, Technical Papers and Panel,* v. 21, 1953, 10 p.

Strength of alloys, rigidity, machinability, and basic metal forming processes. Photographs, drawings.

**6665 Phase-Plane Analysis. A General Method of Solution for Two-Position Process Control.** D. P. Eckman. *ASME, Transactions,* v. 76, Jan. 1954, p. 109-116; disc., p. 116.

Includes diagrams, graphs. 8 ref.

**6666 Transient Thermal Stresses in Circular Disks and Cylinders.** G. Horvay. *ASME, Transactions,* v. 76, Jan. 1954, p. 127-135.

Mathematical analysis. Diagram, graphs. 6 ref.

**6667* The Applicatin of Statistical Methods to Servo-Mechanisms.** R. E. Vowels. *Australian Journal of Applied Science,* v. 4, Dec. 1953, p. 469-488.

Includes diagrams. 30 ref.

**6668 The Sources of Electron-Induced Contamination in Kinetic Vacuum Systems.** A. E. Ennos. *British Journal of Applied Physics,* v. 5, Jan. 1954, p. 27-31.

Various materials used in vacuum systems were assessed by introducing them into a clean system and measuring carbonaceous deposit formed on a surface bombarded by electrons. Diagrams, graphs, table. 5 ref.

**6669* Miniature Ball Bearings for Precision Instruments.** William L. Timmerman. *Electrical Manufacturing,* v. 53, Feb. 1954, p. 107-113.

Load-speed relationships, frictional torque factors, shaft and housing fits, internals clearances, methods of mounting, and lubrication. Tables, graphs, diagrams.

**6670* Torsional Vibrations in Diesel-Generator Installations.** (Russian.) S. S. Zimanenko. *Energeticheskii Biulleten,* 1953, no. 11, Nov., p. 1-12.

Nature of twisting vibrations, conditions for emergence of resonances, and causes for shaft stresses. Graphs, diagrams, table. 3 ref.

**6671 The Airy Stress in Curvilinear Coordinates With Application to the Uniform Flexure of a Naturally Curved Spiral Beam.** Karl S. Pister. *Franklin Institute, Journal,* v. 257, Jan. 1954, p. 25-36.

Application of preceding theory; uniform flexure of a beam whose edges are bounded by logarithmic spirals; stress distributions in a typical beam. Graphs. 7 ref.

**6672* Progress Review No. 29: Instrumentation for Process Control.** S. T. Lunt and A. J. Young. *Institute of Fuel, Journal,* v. 27, Jan. 1954, p. 39-46.

Progress in application of automatic process control. Graphs. 25 ref.

**6673 Shrink Fits.** J. H. Faupel. *Machine Design,* v. 26, Jan. 1954, p. 114-124.

Increased efficiency of structural and machine parts can be more economically obtained by using materials in their optimum stressed conditions. Diagrams, graphs, tables. 6 ref.

**6674 Hydraulic Accumulators. III. Separator Designs.** Edward M. Greer. *Machine Design,* v. 26, Jan. 1954, p. 132-135.

Various designs include floating and differential pistons, mechanical bellows, rubber tube, diaphragm, and bag types. Diagrams, photographs.

**6675 Metal Bellows.** J. H. Howard. *Machine Design,* v. 26, Jan. 1954, p. 137-148.

Factors in selection of bellows for efficient use in control, indication, and mechanical assemblies. Tables, diagrams, graph.

**6676 Kinematic Analysis.** Joseph Kaplan and Berthold Pollick. *Machine Design,* v. 26, Jan. 1954, p. 153-160.

Method determines characteristics of such mechanisms as oscillating beam, crank and connecting rod, and four-bar linkage. Diagrams, graphs, tables.

**6677 Ball Piston Pumps and Motors.** H. Stern and W. T. Rauch. *Machine Design,* v. 26, Jan. 1954, p. 216-218, 220, 222, 224, 226.

Taken from "Ball Piston Pumps and Motors" presented at the National Conference on Industrial Hydraulics in Chicago, Ill., Oct. 1953. Diagrams.

**6678 Tracer Controls for Machine Tools.** George L. Rogers and John L. Dutcher. *Machine Design,* v. 26, Jan. 1954, p. 236, 238, 240-242, 244.

Taken from "Practical Considerations in the Use of Tracer Controls" presented at Sixth Annual AIEE Conference on Machine Tools in Cleveland, O., Oct. 1953. Types of tracer systems and their limitations.

**6679 Die Design for Economical Production.** P. S. Tobias and C. Erickson. *Machinery (London),* v. 84, Jan. 8, 1954, p. 55-61.

Dies for producing control instrument parts. Diagrams, photographs.

**6680 Annual Materials Engineering Review and Forecast.** T. C. DuMond. *Materials & Methods,* v. 39, Jan. 1954, p. 111-126.

An appraisal of the past year's developments in engineering materials reveals some changes in use of materials that probably will be forthcoming in 1954. Photographs.

**6681* Mass Producing Precision Work.** H. W. Snook. *Modern Machine Shop,* v. 26, Feb. 1954, p. 122-130.

A machine shop entirely independent of other plant facilities. Photographs.

**6682* Vibration Tests on an Up-River Collier With Special Reference to the Influence of Depth of Water.** W. J. Marwood and A. J. Johnson. *North East Coast Instituiton of Engineers & Shipbuilders, Transactions,* v. 70, Jan. 1954, p. 193-216.

Measurements examine influence of depth of water upon hull critical frequencies. Tables, diagrams, graphs. 12 ref.

**6683 Discontinuous Servo for Control of Power Reactors.** J. M. Harrer and J. A. Deshong, Jr. *Nucleonics,* v. 12, Jan. 1954, p. 45-51.

Principles of CP-3' reactor's control system illustrate desirability of discontinuous-type servo systems for regulation of power reactors. Graphs, diagram. 11 ref.

**6684 "Hot Tapping" Symposium. I. Mechanical Aspects of Hot Tapping.** B. VerNooy. *Petroleum Engineer,* v. 26, Jan. 1954, p. D37-D42.

Possibilities and limitations of latest equipment designed for tapping into pipe lines and other vessels under pressure. Diagrams, photographs.

**6685* Steam Traps Are "Spark Plugs" of Steam-Using Plants. II.** H. E. Hollensbe. *Plant*, v. 9, Feb. 1954, p. 39-44.
Practical pointers on selection, sizing, installation, and maintenance. Graph, photographs, tables.

**6686* Lower and Upper Bounds to the Ultimate Loads of Buckled Redundant Trusses.** E. F. Masur. *Quarterly of Applied Mathematics*, v. 11, Jan. 1954, p. 385-392.
Two theorems are derived establishing lower and upper bounds to ultimate loads. 8 ref.

**6687* On Saint-Venant's Principle.** E. Sternberg. *Quarterly of Applied Mathematics*, v. 11, Jan. 1954, p. 393-402.
Mathematical discussion of principle involving problem of extension, torsion, and flexure of prismatic and cylindrical bodes. 18 ref.

**6688* Plastic Flow in a Deeply Notched Bar With Semi-Circular Root.** Alexander J. Wang. *Quarterly of Applied Mathematics*, v. 11, Jan. 1954, p. 427-438.
Unsteady motion problem of a circular-notched bar pulled in tension in plane strain is considered. Graphs. 7 ref.

**6689* Closure Waves in Helical Compression Springs With Inelastic Coil Impact.** J. A. Morrison. *Quarterly of Applied Mathematics*, v. 11, Jan. 1954, p. 457-471.
Problem of spring surges is mathematically discussed. Drawings, graphs.

**6690* The Torsion and Stretching of Spiral Rods. II.** H. Okubo. *Quarterly of Applied Mathematics*, v. 11, Jan. 1954, p. 488-495.
Mathematical analysis. Graphs.

**6691 'Three-Phase' Kinetic Energy. I.** R. Clerk. *Research*, v. 7, Jan. 1954, p. 27-33.
Brief résumé on history of power transmission and principles of 'three-phase' kinetic enregy. Diagrams, tables. 3 ref.

**6692* Forty-First Wilbur Wright Memorial Lecture. Buckling and Stability.** N. J. Hoff. *Royal Aeronautical Society, Journal*, v. 58, Jan. 1954, p. 3-52.
Investigates behavior of both slender and short columns in the ordinary column test and correlates buckling loads obtained in the test with the critical loads of the classical theory. Diagrams, graphs, photographs. 106 ref.

**6693* Designing to Meet Requirements of Flame Cutting.** (German.) Hans von Hofe. *Schweissen und Schneiden*, v. 5, no. 12, Dec. 1953, p. 463-472.
Methods, equipment, quality and accuracy of cut, guides, and warp condition. Tables, graphs, photographs, diagrams. 5 ref.

**6694 Device for Applying Uniform Loading to Boundaries of Complicated Shape.** A. J. Durelli, R. L. Lake, and C. H. Tsao. *Society for Experimental Stress Analysis, Proceedings*, v. 11, 1953, p. 55-61.
Method consists of a rubber tube in a grooved fixture, which conforms to shape of the boundary. Pressure is applied by inflating tube with compressed gas. Photographs, diagrams, graph, table. 5 ref.

**6695 Initial Fringes in Photoelastic Models and Their Effects.** Robert M. Gray. *Society for Experimental Stress Analysis, Proceedings*, v. 11, 1953, p. 115-118.
Includes calculations which will permit separation of initial from final pattern, as well as a correction for direction of stress. Graph, tables.

**6696 Use of Brittle Coating Data in Stress Analysis.** A. J. Durelli and C. H. Tsao. *Society for Experimental Stress Analysis, Proceedings*, v. 11, 1953, p. 181-196.
Law of failure of brittle coating; state of stress in coating; determination of ultimate strength of coating; analysis of brittle coating data; failure chart of coating; and effect of refrigeration are covered in detail. Photographs, diagrams, graphs.

**6697 Elastic Buckling Under Combined Stresses of Flat Plates With Integral Waffle-Like Stiffening.** Norris F. Dow, L. Ross Levin, and John L. Troutman. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3059, Jan. 1954, 19 p. (TL570 Un3t)
Theory and experiment were compared and found in good agreement. Graphs, photographs, table, diagram. 13 ref.

**6698 Investigation of Sandwich Construction Under Lateral and Axial Loads.** Wilhelmina D. Kroll, Leonard Mordfin, and William A. Garland. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3090, Dec. 1953, 58 p. (TL570 Un3t)
Tests under combined axial load and lateral pressure on 12 bonded sandwich panels with simply supported loaded edges and free unloaded edges. Diagrams, graphs, photographs, tables. 3 ref.

**6699 Time-Dependent Buckling of a Uniformly Heated Column.** Nathan Ness. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3139, Jan. 1954, 18 p. (TL570 Un3t)
Investigates time-temperature-dependent buckling of a pin-jointed constant-section column whose initial curvature is defined by a half-sine wave when material is linearly viscoelastic and is heated uniformly along column at a prescribed time rate. Graph, diagram. 9 ref.

**6700* Mechanics of Tool Engineering. V. Turning Tools and Techniques.** Andrew E. Rylander. *Western Machinery and Steel World*, v. 45, Jan. 1954, p. 79-84.
Includes diagrams, photographs.

*Books and Miscellaneous Publications*

**6701 Designing by Photoelasticity.** R. B. Heywood. 414 p. 1952. Chapman & Hall, Ltd., London. (TA406 H51d)
Covers behavior of light in polariscope; photoelastic materials; models: their preparation and testing; model stresses applied to prototypes; frozen stress techniques for three-dimensional analysis; stress concentration in particular notches; stress concentration in screw threads, bolts, and nuts; stress concentration at holes; improvement of designs; and application of stress concentration factors.

**6702 Formulas for Stress and Strain.** Raymond J. Roark. 3rd Ed. 381 p. 1954. McGraw-Hill. (TG265 R54f3)
Primarily as a reference book. A compact, adequate summary of the formulas, facts, and principles pertaining to strength of materials.

***See also:***
**5865** (stress around rectangular cutouts in torsion boxes)
**5879** (shear lag effects in box beam vibrations)
**6447** (servomechanisms)
**6778** (pelletizing apparatus)
**6901** (stresses in thick walled cylinders)
**6939** (stresses in beams)
**6941** (precision instrument for stress analysis)
**6952** (creep binding and buckling of columns)
**6953** (creep buckling of columns)
**6958** (flexural behavior of Al beams)
**6961** (applied elasticity)
**6970** (electro-erosion machining)
**6974** (tool applications)
**7008** (pumps for hydraulic presses)
**7230** (machining of acrylic plastics)

## METALLURGY

**6703 Ternary Alloys Formed by Aluminium, Transitional Metals and Divalent Metals.** (English.) G. V. Raynor, C. R. Faulkner, J. D. Noden, and A. R. Harding. *Acta Metallurgica*, v. 1, no. 6, Nov. 1953, p. 629-648.
Main features of equilibria in terms of free energies of phases present and data, together with results of previous work. Graphs, diagrams, tables. 32 ref.

**6704 Jet Metals.** William P. Brotherton. *Aero Digest*, v. 68, Feb. 1954, p. 40, 42, 44, 46.
New demands speed up the search for alloys to meet jet-age needs. Reviews present applications. Photograph, graph.

## *Metallurgy*

**6705 Beryllium: Metal With a Future.** *Chemical Age,* v. 70, Jan. 23, 1954, p. 279-282.

A review of its production and uses. 3 ref.

**6706* Modern Trends in the Manufacture and Use of Cold Upsetting Tools. II.** J. Billigmann. *Draht (English Ed.),* 1953, no. 17, Dec., p. 13-18.

Factors influencing tool life, means of improving it, design modifications, choice of steels, and heat treating processes. Diagrams, tables, graphs. 12 ref.

**6707 Metals.** *Engineering and Mining Journal,* v. 155, Feb. 1954, p. 72-91, 134, 136, 138.

Includes "Gold", M. A. Kriz; "Silver", Francis H. Wemple; "Copper", H. H. Wanders; "Lead", Robert L. Ziegfeld; "Zinc", Charles R. Ince; "Uranium", Donald L. Everhart; "Titanium", Alfred F. Tumin; "Aluminum", Irving Lipkowitz; "Magnesium", J. D. Hanawalt; and "Tin", H. H. Wanders. Graphs, tables, maps.

**6708 Minor Metals.** Charles White Merrill. *Engineering and Mining Journal,* v. 155, Feb. 1954, p. 92-96, 133.

Includes "Antimony", Abbott Renick; "Beryllium", Robert F. Griffith; "Mercury", Helena M. Meyer; "Arsenic", Abbott Renick; "Bismuth", Abbott Renick; "Cadmium", Robert L. Mentch; and "Platinum Group", James E. Bell. Tables, diagrams.

**6709 Ferro-Alloy Metals.** Norwood B. Melcher. *Engineering and Mining Journal,* v. 155, Feb. 1954, p. 97-102.

Includes "Tungsten", Robert W. Geehan; "Molybdenum", Robert W. Geehan; "Manganese", Gilbert L. DeHuff, Jr.; "Cobalt", Hubert W. Davis; "Nickel", Hubert W. Davis; and "Chromium", Charles Katlin. Tables.

**6710 Metallurgy.** A. W. Schlecten. *Engineering and Mining Journal,* v. 155, Feb. 1954, p. 126-128.

Review of 1953 literature which explains extractive processes in terms of fundamental reactions and relations.

**6711* Observations on the Preparation of Lead-Bronze.** (French.) *Fonderie,* 1953, Nov., no. 94, p. 3693-3696.

Treatment by various slag forming agents. Tables, graph.

**6712 High Purity Chromium. Key to Better Alloys.** H. L. Gilbert and H. A. Johansen. *Iron Age,* v. 173, Jan. 21, 1954, p. 93-96.

Production, physical and mechanical properties, and possibilities of new alloys with higher strengths at high temperatures. Photographs, photomicrographs, table. 15 ref.

**6713 Developments in the Iron and Steel Industry During 1953.** I. E. Madsen. *Iron and Steel Engineer,* v. 31, Jan. 1954, p. 120-158.

Covers production, expansion, foreign plants, raw material supplies, improvements in melting and rolling, controls, materials handling, and mechanical and electrical equipment. Photographs, diagrams, graph, table.

**6714 Titanium Metal and the Future.** *Light Metals,* v. 17, Jan. 1954, p. 14-16.

Compares mechanical properties, corrosion resistance and cost of Ti with stainless steel, Al, Mg, Zr, Cu and Cu alloys, and other metals and materials. Table. (To be continued.)

**6715 Non-Heat-Treatable Titanium Alloys. Processing Details.** T. A. Dickinson. *Light Metals,* v. 17, Jan. 1954, p. 16-17.

Processing, welding, cleaning, and application; physical and mechanical properties; and corrosion resistance. Photographs, table.

**6716 Standards for Aluminum Casting Alloys.** F. H. Smith. *Light Metals,* v. 17, Jan. 1954, p. 17-20.

Compares British and foreign specifications and chemical composition of various Al alloys. Tables. (To be continued.)

**6717* New Honeycomb Processing Method.** Frank Charity. *Machine and Tool Blue Book,* v. 49, Feb. 1954, p. 156-160, 162.

Process used by an aircraft industry. Photographs.

**6718 Magnesium for Electronics and Electrical Applications.** *Magnesium,* 1954, Feb., p. 1-7.

In a steadily-growing number of uses, no other metal can do the job as well. Photographs, diagrams.

**6718a* History and Status of Constitution Research. I.** (German.) H. Spengler. *Metall,* v. 8, nos. 1-2, Jan. 1954, p. 24-25.

Research work accomplished on constitution of alloys up to 1950. Tables, graphs. 4 ref.

**6719* Preparation and Constitution of Copper-Boron Alloys.** (German.) F. Lihl and O. Feischl. *Metall,* v. 8, nos. 1-2, Jan. 1954, p. 11-19.

Methods of preparing alloys; thermal analysis and conductivity measurements; isolation; and analysis of the boride as a means of studying structure of the alloys. Micrographs, tables, graphs. 7 ref.

**6720* Cable With Pressed Aluminum Casing.** (German.) *Metall,* v. 8, nos. 1-2, Jan. 1954, p. 32-33.

Successful replacement of Pb by Al as cable jackets and mechanical properties of Al jackets. Table, graph, photographs.

**6721* Applications of Copper.** (Italian.) P. Lombardi. *Metallurgia italiana,* v. 45, no. 10, Oct. 1953, p. 374-386.

Application for special conductors, various alloys, and powder metallurgy. Diagrams, graphs, tables.

**6722 High-Speed Mill Forms, Induction Welds and Sizes Thin-Gage Nonferrous Tubing.** Thomas J. Crawford. *Metal Progress,* v. 65, Feb. 1954, p. 65-69.

Machine for continuous high-speed cold forming and welding. Photographs, micrograph, diagram.

**6723 Electrical Steel. A Triumph of Steelmaking, Heat Treatment and Scientific Metallurgy.** William Jones. *Metal Progress,* v. 65, Feb. 1954, p. 70-74.

Portion of address, ASTM meeting, Oct. 15, 1953, St. Louis. Fe-Si alloys and their use in magnetic core construction. Photographs, table.

**6724 Introducing: the New Self-Lubricating High Speed Steels.** Stewart G. Fletcher. *Metal Progress,* v. 65, Feb. 1954, p. 161-162, 164, 166.

Improved machinability and internal cutting-edge lubrication are obtained. Micrographs, table, photograph.

**6725 Permanent Magnet Steels and Alloys.** D. Hadfield. *Metal Treatment and Drop Forging,* v. 21, Jan. 1954, p. 15-24.

Permanent-magnet production process; manufacture of magnet steels and alloys; and future trends. Photographs, tables, graphs. 18 ref.

**6726 A Dictionary of Metallurgy.** A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging,* v. 21, Jan. 1954, p. 29-34.

Defines kindling temperature to laterite. Tables. (To be continued.)

**6727* Method and Production of Cobalt-Tungsten Alloy.** (Polish.) St. Stolarz. *Prace Instytutow Ministerstwa Hutnictwa,* v. 5, no. 5, Sept.-Oct. 1953, p. 298-302.

Chemical composition, density, hardness, strength properties, and microscopic observations. Photographs, tables, diagrams, micrographs. 3 ref.

**6728* PMG-Bronzes.** (French and German.) H. Bovet. *Pro-Metal,* v. 6, no. 36, Dec. 1953, p. 254-260.

Origin, properties, and uses. Micrographs, tables, graph, photographs.

**6729* Copper in the Refrigeration Industry.** (German and French.) F. Hermann. *Pro-Metal,* v. 6, no. 36, Dec. 1953, p. 266-270.

Uses of tubes and connections. Photographs, diagram.

**6730* The Growing Promise of Titanium.** Julius J. Harwood. *Research Reviews, Office of Naval Research,* Dec. 1953, p. 1-7.

A summary of uses of Ti. Photographs, graph.

**6731* An Example of the Transference of Metallographic Laws and Phenomena: From Light Aluminum Alloys to Heat-Resistant Austenitic Alloys.** (French.) Albert Portevin. *Revue de métallurgie*, v. 50, no. 12, Dec. 1953, p. 809-816.

Importance of applying knowledge gained in one field to problems of another; application of phenomena; laws; and results determined in study of light alloys to austenitic alloys. 17 ref.

**6732 Germanium, a Secondary Metal of Primary Importance.** Robert C. Fite. *Scientific Monthly*, v. 78, Jan. 1954, p. 15-18.

Historical recap with properties, occurrence, and uses. Photographs, diagrams. 4 ref.

**6733 Performance Evaluation of a Magnesium Alloy Truck Wheel.** Marvin H. Polzin. *Society for Experimental Stress Analysis, Proceedings*, v. 11, 1953, p. 65-80.

Advantages of Mg over steel; use of stresscoat and strain gages to locate and measure strains on the wheel during actual truck maneuvers; fatigue analysis and performance evaluation; and relative merits of testing-to-failure methods and experimental stress analysis techniques. Photographs, diagrams, graphs. 15 ref.

**6734* Titanium the Metal of 1954?** Elmer H. Hahn, Jr. *Tooling and Production*, v. 19, Jan. 1954, p. 39-43.

Physical properties, availability, and applications. Photographs.

**6735* Sampling Aluminum and Copper Alloys.** (German.) August Buckeley. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 6, no. 12, Dec. 1953, p. 473-477.

Differences in composition due to segregation in liquid state or during freezing process and proper procedure for sampling. Diagrams, graphs. 9 ref.

*Books and Miscellaneous Publications*

**6736 Engineering Steels.** Leslie Aitchison and William I. Pumphrey. 923 p. 1953. MacDonald & Evans, Ltd., London. (TA472 Ai9e2)

A study of the properties of steels and principles governing their selection for engineering applications.

**6737 The Rare Earths.** John Eisel, et al. 87 p. Feb. 1952. Harvard Univ. Graduate School of Business Administration, Cambridge, Mass. (QD172.R2 Ei82r)

History, availability, uses, and future of the rare earths.

**6738 (Textbook on General Metallurgy.) Lehrbuch der Allgemeinen Metallkunde.** Georg Masing. 620 p. 1950. Springer-Verlag, Berlin, Germany. (TN665 M37L)

Chapters cover some general principles; constitution theory; atomic structure of metallic crystals; diffusion; formation of crystalline metals; physical properties of metals; plastic deformation; internal stresses; recovery and recrystallization; phase changes in crystalline metals; and chemical reactivity of metals with non-metallic substances.

**6739* Engineering Alloys. Names, Properties, Uses.** Norman E. Woldman. 3rd Ed. 1034 p. 1954. American Society for Metals, Cleveland. (TA490 W83e3)

Practical and technical reference book on engineering alloys. Alloy index and data; directory of manufacturers and their alloys; key index to manufacturers; and a useful data appendix.

**6740* Materials Survey. Tin.** Div. of Mineral Economics, Pennsylvania State College. Chapters individually paged. 1953. U. S. National Production Authority, Dept. of Commerce, Washington, D. C. (TP245.T8 Un3.5m)

Covers physical and chemical properties of tin; history; definitions and descriptions of types, forms, and grades; tin resources; mining; beneficiation; smelting and refining; mining companies; smelting, holding, and secondary companies; salient statistics; production; trade; consumption; uses; marketing and prices; commercial and non-commercial stocks; substitution and conservation; international control schemes; and governmental controls.

**6741 Adaptation of Materials Selection Criteria to the Design of Reactor Core Components.** J. P. Frankel. Paper from CONFERENCE ON NUCLEAR ENGINEERING, 1953 PROCEEDINGS. p. E1-E10. Sept. 9-11, 1953. Univ. of Calif., Berkeley. (QC776 C76p)

Importance of thermal stress in addition to stress induced by load carrying requirements of nuclear reactor components makes design difficult. Graph. 3 ref.

**6742 Metals for Reactor-Core Construction.** Henry A. Saller. Paper from CONFERENCE ON NUCLEAR ENGINEERING, 1953 PROCEEDINGS. p. 11-21. Sept. 9-11, 1953. Univ. of Calif., Berkeley. (QC776 C76p)

Status of various reactor materials are considered under the classifications of fuels, cladding and structural materials, moderators, and control materials. Tables. 16 ref.

## METALS—EXTRACTION AND REFINING

**6743* The Two-Stage Process for the Recovery of Manganese From Open Hearth Slag. A Full Scale Production Trial.** H. W. Hosking and J. A. Gregory. *Australasian Engineer*, 1953, Dec., p. 48-57.

Much valuable data was acquired and a more satisfactory application foreshadowed. Photographs, tables. 3 ref.

**6744* The Firing of Open Hearth Furnaces.** G. Reginald Bashforth. *British Steelmaker*, v. 20, Jan. 1954, p. 18-21.

Considerations determining choice of appropriate fuel. Comparative data on American and German fuel policy and practice. Diagram, graphs. 17 ref.

**6745* Blast Furnace Blower Control.** *British Steelmaker*, v. 20, Jan. 1954, p. 24-25, 27-28.

Grid-controlled Hg-arc rectifier used in conjunction with standard pneumatic regulators to control speed of electrically-driven blast furnace blowers, providing reliable and flexible method of regulating automatically volume of air supplied to two furnaces. Photographs, graphs, diagrams.

**6746 Significance of Mechanism and Rate of Collecting for Intensification of the Flotation Process.** V. A. Glembotskii. *Henry Brutcher, Altadena, Cal., Translation no.* 2542, 11 p. (From *Izvestiya Akademii Nauk SSSR, Otd. Tekh. Nauk*, 1950, no. 2, p. 253-258.)

Mechanism and rate of heterogeneous reaction between collecting agent and surface of mineral particles. Studies were made on basis of flotation experiments on narrow mineral particle size ranges with special attention to surface irregularities, nature of sorptive forces, and possible interaction among adsorbed collector molecules. Graphs. 7 ref.

**6747 Rate of Reduction of Iron Oxides.** E. P. Tatievskaya, G. I. Chufarov, and V. K. Antonov. *Henry Brutcher, Altadena, Cal., Translation no.* 3074, 9 p. (Condensed from *Zhurnal Fizicheskoi Khimii*, v. 24, no. 4, 1950, p. 385-393.)

Investigates variation in equilibrium pressure of oxygen during dissociation of $Fe_2O_3$, $Fe_3O_4$, and FeO. Tables, graphs. 4 ref.

**6748* Control of the Slag in Basic Open-Hearth Furnaces.** (French.) M. Bernard. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques*, 1953, no. 12, p. 1923-1934.

Four methods for determining chemical composition. Diagrams, photographs.

**6749* Explosion of Cowper Chimneys.**( French.) Dardenne. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques*, 1954, no. 1, p. 127-131; disc., p. 131-132.

Circumstances and probable causes. Drawings, table.

**6750 Recovery of Manganese From Low-Grade Ores.** Louis N. Allen, Jr. *Chemical Engineering Progress*, v. 50, Jan. 1954, p. 9-13.

Process in which low-grade Mn concentrates are chemically treated to make high-grade $Mn_2O_3$ product. Diagram, photographs, tables.

**6751 Extractive Metallurgy of Zirconium by the Electrolysis of Fused Salts. II. Process Development of the Electrolytic Production of Zirconium From $K_2ZrF_6$.** M. A.

## *Metals—Extraction and Refining*

Steinberg, M. E. Sibert, and E. Wainer. *Electrochemical Society, Journal*, v. 101, Feb. 1954, p. 63-78.

Investigates optimum conditions. Photomicrographs, tables, diagrams, graphs, photographs. 7 ref.

**6752 Ore Dressing.** Bunting S. Crocker. *Engineering and Mining Journal*, v. 155, Feb. 1954, p. 120-122, 132-133.

Industry interest centers on hydrometallurgy.

**6753 Iron Ore Beneficiation.** Ferd D. DeVaney. *Engineering and Mining Journal*, v. 155, Feb. 1954, p. 123-125.

Taconite projects in Lake Superior region.

**6754* Selenium. Its Uses and Recovery.** *Glass*, v. 31, Jan. 1954, p. 21-22, 24.

Shortage of product and possible sources of recovery.

**6755* Using Oxygen for Carbon Steel Melts.** (Czech.) Zdenek Eminger. *Hutnické Listy*, v. 9, no. 1, Jan. 1954, p. 18-24.

Analysis of carbon oxidation by use of gaseous oxygen in electric-arc and high-frequency furnaces. Tables, graphs, photographs, diagrams. 3 ref.

**6756 Iron Ores.** C. Rekar. *Iron & Steel*, v. 27, Jan. 1954, p. 31-32. (Abridged from *Stahl und Eisen*, v. 73, Aug. 13, 1953, p. 1094-1101.)

Investigates reducibility. Table, graphs, diagram.

**6757 Activity Coefficients of Oxygen and Phosphorus in Iron-Oxygen-Phosphorus Melts.** J. Pearson and E. T. Turkdogan. *Iron and Steel Institute, Journal*, v. 176, Jan. 1954, p. 19-23.

Molten Fe-O-P alloys have been equilibrated at temperatures between 1572 and 1624 C with hydrogen/water-vapor mixtures of known composition. Tables, graphs, diagram. 23 ref.

**6758 Reaction Equilibria Between Metal and Slag in Acid and Basic Open-Hearth Steelmaking.** E. T. Turkdogan and J. Pearson. *Iron and Steel Institute, Journal*, v. 176, Jan. 1954, p. 59-63.

Studies extent of equilibrium between metal and slag with respect to reactions involving Mn, P, ferrous oxide, and C. Graphs. 17 ref.

**6759 Electric Furnace vs. Open Hearth in Cold Metal Shops.** L. F. Reinartz and H. C. Barnes. *Iron and Steel Engineer*, v. 31, Jan. 1954, p. 114-119.

Taken from paper presented at Philadelphia Regional Technical Meeting of AISI, Dec. 3, 1953. Discusses fuel, material handling, steel quality, and economic considerations. Tables.

**6760 Optimum Composition of Blast Furnace Slag as Deduced From Liquids Data for the Quaternary System $CaO$-$MgO$-$Al_2O_3$-$SiO_2$.** E. F. Osborn, R. C. DeVries, K. H. Gee, and H. M. Kraner. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Jan. 1954, p. 33-45.

Results of experimental studies. Phase diagrams, tables, photograph. 19 ref.

**6761* Studies on Contact Angle Measurements & Their Application to the Concentration of Manganese Ores by Froth Flotation. I. Contact Angle Studies at the Pyrolusite Surface. II. Beneficiation of Low Grade Manganese Ores by Froth Flotation.** U. N. Bhrany and M. R. A. Rao. *Journal of Scientific & Industrial Research*, v. 12, sec. B, Dec. 1953, p. 590-604.

Experimental results are discussed. Tables, graphs. 39 ref.

**6762* The Influence of Frothers Upon the Grade of Flotation Concentrates.** S. A. Wrobel. *Mine & Quarry Engineering*, v. 20, Jan. 1954, p. 32-38.

Laboratory results show recovery and purity of flotation concentrates are influenced by frother used. Tables, graphs.

**6763* Methods of Processing Uranium Ores.** S. J. Swainson. *Mining Congress Journal*, v. 40, Jan. 1954, p. 48-50.

Plant design depends on ore to be treated but basic steps are similar. Photographs.

**6764 Nodulizing Iron Ores and Concentrates at Extaca.** R. L. Bennett, R. E. Hagen, and M. V. Mielke. *Mining Engineering*, v. 6, Jan. 1954, p. 32-38.

Experimental kiln provides data on agglomeration of high grade ore fines and taconite concentrates. Photographs, diagram, graph, tables.

**6765* The Free World's Nickel Refining Troubles.** *Mining Journal*, v. 242, Jan. 29, 1954, p. 124-125.

Reviews history of Ni industry. Predicts erection of Ni refining facilities, both on the North American Continent and in Cuba, tailored to suit requirements of individual deposits.

**6766* Separation of Chemically Pure Vanadium From the Gaseous Phase.** (German.) G. Jantsch and F. Zemek. *Monatshefte für Chemie*, v. 84, no. 6, Dec. 15, 1953, p. 1119-1126.

Reduction of $VCl_4$ with pure H. Diagrams, micrographs, spectrograph. 22 ref.

**6767 Radioactive Tracers for Tagging Special Steel Melts.** David L. Douglas. *Nucleonics*, v. 12, Jan. 1954, p. 16-18.

Radioisotopes offer several advantages over customary chemical analysis. Time involved is negligible, little plant space is necessary, and melt identification is definite. Tables. 4 ref.

**6768* Comparison of American and German Basic Open-Hearth Furnaces.** (German.) Arno Ristow. *Stahl und Eisen*, v. 73, no. 24, Nov. 19, 1953, p. 1574-1582; disc., p. 1582-1583.

Includes percentage of total steel production, number and capacity of furnaces, annual capacity of steel mill, type of heating, quality of steel, and furnace linings. Tables, graphs, diagrams. 15 ref.

**6769* The Effect of Granulation on the Properties of Slag Sands.** (German.) Walter Kramer. *Stahl und Eisen*, v. 73, no. 24, Nov. 19, 1953, p. 1596-1600.

Experimental production of granular and spongy blast-furnace slag sands; and composition and effect of granulaton on properties of brick and cement made from these slags. Diagrams, photographs, tables, graphs.

**6770* Improving Service Life of Basic Converter Linings.** (German.) Paul Metz. *Stahl und Eisen*, v. 74, no. 1, Jan. 1, 1954, p. 10-24.

Service life was increased by maximum residual carbon in form of graphite, maximum percentage of coarse grains in the dolomite, denseness of refractory materials, vibrating during lining process, and firing with oil burners. Graphs, diagrams, photographs, tables. 23 ref.

**6771* Status and Development of the Electrode Controls on Electric-Arc Steel-Melting Furnaces.** (German.) Albert Driller. *Stahl und Eisen*, v. 74, no. 2, Jan. 14, 1954, p. 82-95.

Includes diagrams, graphs, photographs.

**6772 Oxygen Shortens Open Hearth Meltdowns.** O. D. Eyre. *Steel*, v. 134, Feb. 8, 1954, p. 116, 119.

Taken from a paper presented at the Fall Meeting, Southern Ohio Section, National Open Hearth Committee, AIME. Use of auxiliary corner burners resulted in greater tonnages and better B.t.u. economy. Diagrams.

**6773 Centrifugal Separation of Liquid and Solid Phases From Some Binary Alloys.** A. K. Schellinger and M. J. Spendlove. *U. S. Bureau of Mines, Report of Investigation* 5007, Nov. 1953, 19 p. + 21 plates. (TN21 Un3r)

Result of experimental tests on use of centrifugal force for separating liquid and solid phases in molten nonferrous alloys. Tables, diagrams, graphs, photographs, micrographs.

**6774* Deoxidizing of Lead.** (German.) W. W. Krysko. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 6, no. 11, Nov. 1953, p. 442-445.

Solubility of O in Pb and experiments for developing a method for eliminating O from Pb by means of Al additions. Advantages are outlined. Photographs. 12 ref.

**6775* Problems of Ore Beneficiation in Yugoslavia. III.** (German.) Werner Gründer. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 12, Dec. 1953, p. 477-484.

Laboratory and large-scale experiments solve important problems in beneficiation of Cr, Hg, W, and Mn ores. Describes equipment and ore-dressing methods. Tables, diagrams, graphs, micrographs.

**6776* Continuous Process of Lead Refining in the Oker Lead-Copper Smelter.** (German.) Jürgen Feiser, Helmut Börger, and Georg Krahn. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 7, no. 1, Jan. 1954, p. 1-3.

Modification of continuous refining at Port Pirie in Australia compensates for low production at Oker. Discusses furnace arrangement. Diagrams. 4 ref.

**6777* Recent Developments in the Field of Sinter Roasting, Their Importance to the Smelting of Lead Ores.** (German.) Helmut Wendeborn. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 7, no. 1, Jan. 1954, p. 3-11.

Direct process of extracting Pb from Pb rich concentrates. Advantages of compressed-air sintering. Diagrams, photographs, tables, graphs. 7 ref.

**6778* The New Roasting Plant in the Neiveheim Zinc Smelter of the Stolberg Zinc AG.** (German.) Reinhard Fischer. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 7, no. 1, Jan. 1954, p. 11-14.

Plant arrangement, pelleting apparatus, and a multiple-tier roasting furnace. Diagram, photographs.

**6779* Microscopic Investigation of Sergregation Processes in Slag Melting.** (German.) Sven Lundqvist. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 7, no. 1, Jan. 1954, p. 14-17.

Metallographic studies of slags on Cu matte melts at usual temperatures reveal that these slags may segregate magnetite due to low rate of magnetite solution in the melt. Photomicrographs. 11 ref.

**6780* Smelting of Ilmenite.** (German.) Walter Schaller. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 7, no. 1, Jan. 1954, p. 18-22.

Metallic Fe can be extracted by smelting with $Na_2O$ at temperatures up to 1400 C. Graphs, tables, micrographs. 6 ref.

*Books and Miscellaneous Publications*

**6781 The Physical Chemistry of Copper Smelting.** R. W. Ruddle. 156 p. 1953. Institution of Mining and Metallurgy, London. (TN780 R83p)

Outline of smelting process; constitution of matte and of Cu smelting slags; formation of magnetite; Cu losses in smelting and converting; recovery of S from smelter gases; and elimination of impurities during Cu smelting.

**6782 The Physical Chemistry of Melts. A Symposium on Molten Slags and Salts.** 106 p. 1953. Institution of Mining and Metallurgy, London. (TN673 P56)

Consists of six papers, separately abstracted.

**6783 The Constitution of Liquid Silicates.** J. O'M. Bockris. Paper from THE PHYSICAL CHEMISTRY OF MELTS. A SYMPOSIUM ON MOLTEN SLAGS AND SALTS. p. 9-15; disc., p. 16-21. 1953. Institution of Mining and Metallurgy, London. (TN673 P56)

Value of thermodyanamic study and methods of investigating the structure of melts are covered in detail. Table. 20 ref.

**6784 Some Aspects of the Constitution of Liquid Oxides.** J. W. Tomlinson. Paper from THE PHYSICAL CHEMISTRY OF MELTS. A SYMPOSIUM ON MOLTEN SLAGS AND SALTS. p. 22-33; disc., p. 33-34. 1953. Institution of Mining and Metallurgy, London. (TN673 P56)

Includes graphs, table. 29 ref.

**6785 Anomalies in Surface Tension of Silicates.** T. B. King. Paper from THE PHYSICAL CHEMISTRY OF MELTS. A SYMPOSIUM ON MOLTEN SLAGS AND SALTS. p. 35-41; disc., p. 41-45. 1953. Institution of Mining and Metallurgy, London. (TN673 P56)

Includes tables, graphs. 6 ref.

**6786 The Correlation Between Activity and Composition in Mixtures of Fused Salts.** H. Flood, T. Forland, and K. Grjotheim. Paper from THE PHYSICAL CHEMISTRY OF MELTS. A SYMPOSIUM ON MOLTEN SLAGS AND SALTS. p. 46-59; disc., p. 59-62. 1953. Institution of Mining and Metallurgy, London. (TN673 P56)

Theoretical discussion. Tables, graph. 13 ref.

**6787 Heats of Mixing in the System Ferrous Oxide—Silica in the Liquid State.** M. Rey. Paper from THE PHYSICAL CHEMISTRY OF MELTS. A SYMPOSIUM ON MOLTEN SLAGS AND SALTS. p. 63-70; disc., p. 70-74. 1953. Institution of Mining and Metallurgy, London. (TN673 P56)

Even in a system such as ferrous oxide-silica, which has been the subject of several studies, some points remain in doubt Further work is desirable. Graphs, table. 15 ref.

**6788 Thermodynamic Aspects of Molten Slags.** F. D. Richardson. Paper from THE PHYSICAL CHEMISTRY OF MELTS. A SYMPOSIUM ON MOLTEN SLAGS AND SALTS. p. 75-95; disc., p. 95-100. 1953. Institute of Mining and Metallurgy, London. (TN673 P56)

Systems $CaO\text{-}B_2O_3$; $CaO\text{-}SiO_2$; other silicate mixtures; heats of fusion; and freezing point depressions are discussed. Graphs. 28 ref.

**6789 Recent Developments in Mineral Dressing, Symposium.** 766 p. Sept. 1952. Institution of Mining and Metallurgy, London, England. (TN500 R24)

A symposium arranged by the Institution of Mining and Metallurgy, held Sept. 23-25, 1952. Papers are separately abstracted.

**6790 The Third Sir Julius Wernher Memorial Lecture: Radioactivity in Mineral Dressing.** A. M. Gaudin. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM, p. xxvii. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Ways in which radioactivity can be made to serve the purposes of the mineral engineer, in research in operative control, and in development of new mineral separating processes.

**6791 Purpose in Fine Sizing and Comparison of Methods.** E. J. Pryor, H. N. Blyth, and A. Eldridge. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 11-30; disc., p. 85-97 + 3 plates. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Each method used gave results which are well within the limits of experimental error of normal head-sampling and also of cutting test samples of ores used. Sedimentation method (breaker decantation) gave best results on material used in tests described. Graphs, tables, diagram.

**6792 Fundamental Principles of Sub-Sieve Particle-Size Measurement.** H. Heywood. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 31-58; disc., p. 85-97 + 1 plate. Sept. 1952. Institute of Mining and Metallurgy, London. (TA500 R24)

Reviews fundamental principles underlying sedimentation processes and presents them in a form suitable for a critical analysis of the manifold applications of particle motion in fluids to industrial problems. Diagrams, tables, graphs. 11 ref.

**6793 The Technique of Particle Size Analysis in the Sub-Sieve Range.** G. Lowrie Faris. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 59-74; disc., p. 85-97 + 1 plate. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Four selected methods of size analysis. Tables, diagrams. 8 ref.

**6794 Release Analysis, A New Tool for Ore Dressing Research.** C. C. Dell. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 75-84; disc., p. 85-97. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Technique of 'release anlysis' has so far been carried out only with Mufulira Cu ore, but it is believed that it will find general application elsewhere to the problem of dealing with middlings and possibly even to separation methods other than flotation. Graphs, tables, diagram.

## *Metals—Extraction and Refining*

**6795 Mathematics of Crushing and Grinding.** Fred C. Bond. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 101-115; disc., p. 163-180. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Theory of comminution states that total input represented by a given weight of a crushed or ground product is inversely proportional to the square root of the diameter of the product particles. 8 ref.

**6796 A Method of Assessing the Grinding Efficiency of Industrial Equipment.** W. F. Carey and C. J. Stairmand. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 117-136; disc., p. 163-180 + 1 plate. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Associated energy concept provides a yardstick by means of which a practical value may be obtained for grinding efficiency of industrial mills. Tests on a number of installed mills and net grinding efficiencies ranging from 6 to 36% have been observed. Graphs, tables. 6 ref.

**6797 Defining the Scope of the Open Circuit Rod-Mill in Comminution.** J. F. Myers. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 137-150; disc., p. 163-180 + 1 plate. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Includes diagrams, tables.

**6798 Crushing and Screening in Mineral Dressing Plants.** G. J. Brown. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 151-162; disc., p. 163-180 + 3 plates. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Developments in crushers and screens; selection of crusher to suit the ore; and importance of screen analysis. Diagrams.

**6799 Recent Developments in Classification and Fluidization as Applications of the Principles of Particle Dynamics.** J. V. N. Dorr and F. L. Bosqui. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 185-204; disc., p. 205-207 + 2 plates. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Latest developments in classification and 'FluoSolids' techniques. Illustrates two unit processes, diverse as regards objective, but basically related as applications of the principles underlying particle dynamics. Tables, diagram. 24 ref.

**6800 A Study of the Motion of Solid Particles in a Hydraulic Cyclone.** D. F. Kelsall. Paper from RECENT DEVELOPMENT IN MINERAL DRESSING, SYMPOSIUM. p. 209-227; disc., p. 247-256 + 4 plates. Institute of Mining and Metallurgy, London. (TN500 R24)

Optical method of solid particles within an operating cyclone has thrown new light on mechanism of particle separation and revealed undesirable flows which reduce efficiency. Graphs, table, diagram. 14 ref.

**6801 Major Alterations in Heavy Media Separation Practice During Recent Years.** K. A. Fern. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 271-278; disc., p. 288-295. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Originally developed in treatment of Pb-Zn ores and of Fe ores, the Heavy Media Separation process is now being used to treat a wide range of metallic and non-metallic minerals, from diamonds at one end of the scale to gravel at the other. Tables.

**6802 The Hydrocyclone, Its Application and Its Explanation.** F. J. Fontein and Ir. C. Dijksman. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 229-246; disc., p. 247-256. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Survey of the most essential fields of application known at the present time. A general insight into the operation of the cyclone is provided. Diagrams, graphs, tables. 8 ref.

**6803 Recent Developments in Gravity Concentration.** F. B. Michell. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 261-269; disc., p. 288-295 + 1 plate. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

It now appears that flotation may be losing some of its preeminence as a dressing method and leaching is being examined more closely than heretofore. As a result, there may be a revival of gravity methods for a rough concentration of some ores and as preliminary to the adoption of leaching techniques. Diagrams. 6 ref.

**6804 Recent Developments in Plant Design for Dense Medium Processes.** F. J. Trotter. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 279-287; disc., p. 288-295. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Continuous progress has been made during the past two decades in developing dense medium separation into a firmly established method of ore concentration. In its infancy the process was at best looked upon as an effective substitute for jigging, but its considerably wider scope has now been fully recognized and has led to a large number of applications where jigging could not be applied at all.

**6805 Concentrating Ores by Pneumatic Tables.** E. A. Knapp. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 299-311; disc., p. 321-323 + 2 plates. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Results in tabular form on samples of various ores. In practice cleaner concentrate could be produced as the line of concentrate would be larger. Tables, flowsheets. 10 ref.

**6806 Concentration of Eluvial or Co-Eluvial Deposits in Arid Areas.** E. A. Knapp and C. T. Sweet. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 313-320; disc., p. 321-323 + 1 plate. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Progress in further development of machine for concentration of minerals by dry methods. Tables, diagrams.

**6807 Magnetic Separation Applied to Mineral Dressing.** T. G. Hawker. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 325-334; disc., p. 349-357 + 4 plates. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Modern types of magnetic separators and future trends. Graph, tables, diagram.

**6808 Electrostatic Separation.** S. B. Hudson. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 335-348; disc., p. 349-357. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Principles and properties of the plate-type separator and tests on the separation of zircon and rutile are discussed. Tables, graphs. 7 ref.

**6809 Photometric Separation of Ores in Lump Form.** P. C. Newman and P. F. Whelan. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 359-381; disc., p. 382-383 + 1 plate. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Barytes, bauxite, blue marl, calcite, chromite, fluorspar, gypsum, limestone, magnesite, pyrite, witherite, and witherite gangue were tested. Diagrams, tables, graphs.

**6810 The Relation of Crystal Lattice Discontinuities to Mineral Dressing.** A. J. E. Welch. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 387-392; disc., p. 423-430. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Shows how fundamental processes of mineral dressing may be influenced by characteristic properties of crystal lattices.

**6811 Selective Flotation of Metals and Minerals.** J. H. Schulman. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 393-413; disc., p. 423-430. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Adsorption of agents used in monolayer experiments, onto metal and mineral powders, has been investigated quantitatively. This necessitated area determinations of the powder and

measurement of small changes in concentration of solutions of the agent. Graphs, diagrams, tables. 17 ref.

**6812 The Surface Chemistry of Flotation.** Nathaniel Arbiter. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 415-422; disc., p. 423-430. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Structure of the interface; thermodynamics of surface reactions; and wetting effects. 27 ref.

**6813 Flotation Frothers, Their Action, Composition, Properties and Structure.** S. A. Wrobel. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 431-450; disc., p. 451-454. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Specific characteristics of flotation frothers and their dependence upon molecular structure and constitution were correlated and discussed. Diagrams, tables. 33 ref.

**6814 The Process of Bubble-Mineral Attachment.** L. F. Evans and W. E. Ewers. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 457-463; disc., p. 464. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Theory at collision process; experimental measurements on flotation and allied systems; and experimental studies on thinning over hydrophilic and hyrodphobic surfaces. Diagrams. 8 ref.

**6815 Radioactive Isotopes in Mineral Dressing Research, With Particular Reference to Flotation.** John S. Carr. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 465-598; disc., p. 499-501. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Aspects of radioactivity in current literature. An outline of certain aspects as an introduction to the discussion of the mineral dressing applications. Tables, diagram. 88 ref.

**6816 The Application of Electrochemical Methods to Flotation Research.** S. G. Salamy and J. C. Nixon. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 503-516; disc., p. 517-518. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Results show that the reactions at a mercury surface in the presence of xanthates are governed by dissociation constants of complex ions and by solubility products of collector-metal compounds at the surface. Graphs. 15 ref.

**6817 Effects of Soluble Sulphide in the Flotation of Secondary Lead Minerals.** M. G. Fleming. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 521-548; disc., p. 549-554. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Research arose from a technical investigation of ore from the Abenab West mine of the South West Africa Co., Ltd. Graphs, tables, diagram. 37 ref.

**6818 Some Aspects of the Flotation of Oxidized Minerals.** E. J. Pryor. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 555-566; disc., p. 567-570. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Examines the importance of dissolved salts in the mill pulp; fatty acids and frothing; and froth texture. Table, diagram.

**6819 The Flotation of Oxidized Zinc Ores.** Maurice Rey and Paul Raffinot. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 571-576; disc., p. 577-579. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Mineralogy of and collecting reagents for oxidized Zn materials; milling plants; and results of tests are discussed. 9 ref.

**6820 Arsenic and Antimony Sulphide Minerals in Cyanidation.** N. Hedley and H. Tabachnick. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 583-602; disc., p. 603-607. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Determines relative rates of decomposition of arsenopyrite, orpiment, realgar, and stibnite in cyanide solutions of various alkalinities; nature of decomposition products; effects of these minerals on rate of Au dissolution; and means for correcting deleterious effects of minerals in cyanidation. Graphs, tables. 4 ref.

**6821 The Treatment of Ore From the Gold Mines of Union Corporation, Ltd.; A Summary of Metallurgical Practice.** O. A. E. Jackson. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 609-619; disc., p. 620-624. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Functions of crushing, milling, and cyanide sections of five mines in South Africa. Flowsheet, table.

**6822 The Heavy-Media Plant at Stripa Mine, Sweden.** S. Dalhammar and P. H:son Fahlström. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 627-630; disc., p. 631-632. Sept. 1952. Institute of Mining and Metallurgy, London.

Includes diagram, table.

**6823 Recent Developments in Practice at the Sullivan Concentrator.** H. R. Banks. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 633-640; disc., p. 641-646 + 2 plates. Sept. 1952. Institute of Mining and Metallurgy, London. (TN 500 R24)

Number of important changes in crushing, transportation, and concentration of the ore extracted from the Sullivan mine of the Consolidated Mining and Smelting Co. of Canada, Ltd., at Kimberley, B.C., were introduced in 1949. Presents observations regarding effectiveness after some two years of operation. 4 ref.

**6824 The Development of Milling Technique at the Boliden Mining Company.** P. G. Kihlstedt. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 659-666; disc., p. 667-669. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Includes milling program; controlized research; and a review of work accomplished. Table, diagram.

**6825 The Quemont Milling Operation.** C. G. McLachlan, M. J. S. Bennett, and R. L. Coleman. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 671-697; disc., p. 698-699 + 3 plates. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Deals with milling operation of the Quemont Mining Corporation, Ltd. Mineralogical association and analysis; preparation for production; crushing; conveying, and grinding; Cu flotation; primary Zn; pyrite, and scavinging flotation circuits; Cu cleaning circuit and Cu concentrate handling; secondary Zn cleaning circuit and Zn concentrate handling; pyrite pretreatment circuit; and cyanide and pyrite drying plants are covered. Diagrams, tables. 6 ref.

**6826 Design and Construction of Small Concentrators in British Columbia.** H. M. Wright. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 719-750; disc., p. 751-753 + 6 plates. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Summary of requirements for mill design and design and construction of six small plants in British Columbia. Tables, flowsheets.

*See also:*
**5979** (duration of converter bottoms and linings)
**5980** (basic Bessemer furnace linings)
**6002** (bottoms of Bessemer converters)
**6061** (phase separation of graphite-mineral-water-oil system)
**6463** (economic control of alloyed steel manufacture)
**6480** (steel floro in converter)
**6634** (ferrocoke)

## METALS—FINISHING, POLISHING, AND CLEANING

**6827 Belt Finishing of Carbide Tools Proves Effective.** F. J. Lennon, Jr. *American Machinist*, v. 98, Feb. 1, 1954, p. 104-107.

Special abrasive-belt grinders are a suitable alternate to diamond wheels in times of emergency. Photomicrographs, photographs, diagram.

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**6828 Metal Finishing in 1953: Some Highlights of the Year in Industry.** Autolycus. *Electroplating and Metal Finishing*, v. 7, Jan. 1954, p. 4-7.

Present trend toward mechanization and developments in Ni-Cr plating and other processes.

**6829 Automatic Setup Buffs Intricate Aluminum Castings.** James E. Taylor. *Iron Age*, v. 173, Jan. 21, 1954, p. 108-110.

Complicated Al castings are now being buffed automatically with good results. Photographs.

**6830* Powder-Dressing Process.** (German.) E. Zorn. *Metalloberfläche*, Ausgabe A, v. 8, no. 1, Jan. 1954, p. 8-9.

Iron-powder-flame process of dressing unalloyed or low-alloyed steel castings. Photographs, micrograph.

**6831 Surface Brightness of Sheet Aluminium.** J. F. G. Hérenguel. *Metal Treatment and Drop Forging*, v. 21, Jan. 1954, p. 25-28, 48.

Survey and appraisal of various techniques. Diagram, tables, graphs, photographs.

**6832* No Polishing Needed.** Robert O. Johnson. *Precision Metal Molding*, v. 12, Feb. 1954, p. 54-58, 66.

High vacuum metallizing on Zn or Al die castings. Photographs.

**6833* Turnabout at Rheem.** Gilbert C. Close. *Western Machinery and Steel World*, v. 45, Jan. 1954, p. 95-98.

Technique of reversing usual procedure of metal finishing. Raw materials are primed, painted, and even lithographed before actual production or fabrication of metal parts is started. Photographs.

**6834* The Mechanical De-Scaling of Low Carbon Steel Wire Rods.** H. F. Sanderson. *Wire Industry*, v. 21, Jan. 1954, p. 53-55.

Design, operating characteristics, advantages, and limitations of machine.

***See also:***
**6074** (chemical cleaning methods)
**6351** (loop control in pickling lines)
**6655** (lubricants for polishing)

## METALS—FOUNDRY PRACTICE

**6835* Foundry Prepares Own Refractory for Lining and Patching Cupolas.** Herbert F. Scobie. *American Foundryman*, v. 25, Feb. 1954, p. 46-48.

Practice is based on a mixture that is used not only for daily patching but also for lining the cupola. Material is more economical than previous linings used and it gives better metal control due to reduced burn out. Photographs, diagram.

**6836* How Far Should We Go in Foundry Sand Control.** Earl E. Woodliff. *American Foundryman*, v. 25, Feb. 1954, p. 60-65.

Sand control becomes increasingly complex as more sand additives and test methods are developed. A foundryman can go as far as he likes in controlling sands but he will always profit by observing well-established fundamentals in his molding operations. Photographs, table.

**6837 Convection in Molten Metals.** L. I. Sokol'skaya. *Henry Brutcher, Altadena, Cal., Translation no.* 2457, 13 p. (From *Izvestiya Akademii Nauk SSSR, Otd. Tekh. Nauk*, 1949, no. 9, p. 1365-1371.)

Theoretical and practical significance of convection displacement of layers of liquid metal poured in molds. Diagrams, graphs. 4 ref.

**6838 Device for Determining the Fluidity and Rate of Flow of a Stream of Liquid Metal.** L. L. Kunin. *Henry Brutcher, Altadena, Cal., Translation no.* 2516, 4 p. (From *Zavodskaya Laboratoriya*, v. 15, no. 7, 1949, p. 870-872.)

Determination of fluidity of molten metals not only by length of spiral cast but by rate of flow during filling the mold as well. Diagram, graph, photographs. 2 ref.

**6839 Plastic Patterns.** Wm. C. H. Dunn. *Canadian Metals*, v. 17, Jan. 1954, p. 26, 28-29.

Cast plastic patterns are not new, but their use was hindered by war-time shortages of resin and lack of know-how. Advantages are apparent in several different fields of application. Photographs, table.

**6840* Investigation of Microporosity in Castings of Magnesium Alloys.** (French.) Marcel Bardot. *Fonderie*, 1953, Nov., no. 94, p. 3687-3692.

Results of experiments investigating factors causing microporosities of Mg alloys. Micrographs, diagrams, tables. 8 ref.

**6841 Casting Titanium.** John Ham and Roger Veneklasen. *Foundry*, v. 82, Feb. 1954, p. 94-95.

Vacuum melting and casting system. Photograph, radiograph, diagram.

**6842 Master Patternmaking Aids Production.** H. Wilson. *Foundry Trade Journal*, v. 96, Jan. 7, 1954, p. 5-11.

Equipment and techniques employed. Photographs, diagrams. (To be continued.)

**6843 Control in an Investment Foundry.** D. F. B. Tedds. *Foundry Trade Journal*, v. 96, Jan. 14, 1954, p. 37-42.

Layout and operation of a fully-integrated high-production unit. Photographs. (To be continued.)

**6844 Control in an Investment Foundry.** D. F. B. Tedds. *Foundry Trade Journal*, v. 96, Jan. 21, 1954, p. 77-80; disc., p. 80-82.

Various methods and areas of control. Tables.

**6845* Rational Foundry Management.** F. Buckley. *Foundry Trade Journal*, v. 96, Jan. 28, 1954, p. 103-106.

Factors considered in equipment, plant layout, procedures, and personnel attitudes. Diagram, photographs.

**6846* Impregnation of Metal Castings.** *Foundry Trade Journal*, v. 96, Jan. 28, 1954, p. 107-108.

Survey of available methods and materials.

**6847* The Melting of Cast Iron Shavings in the Cupola Furnace.** (German.) S. H. Chrobok. *Giesserei*, v. 40, no. 24, Nov. 26, 1953, p. 634-637.

Economic advantages which make it possible to use shavings in the same manner as other metallic charges. Diagram, photograph, tables, graph.

**6848* Economical Melting of Brass and Bronze Alloys in Reverberatory Foundry Furnaces.** E. R. Thews. *Giesserei*, v. 40, no. 25, Dec. 10, 1953, p. 658-663.

Choice of furnace, furnace linings, and melting procedure.

**6849* The $CO_2$ Hardening Process in the Foundry.** (German.) W. Schumacher. *Giesserei*, v. 40, no. 26, Dec. 24, 1953, p. 678-681.

New process of hardening molds and cores containing waterglass binder with flow of $CO_2$ was shown to be more economical and superior to other methods. Photographs, table.

**6850* Evaluation of Molding Machines.** (German.) W. Gesell. *Giesserei*, v. 40, no. 26, Dec. 24, 1953, p. 682-684.

Principles considered in comparing efficiency and maintenance costs of different molding machines. 6 ref.

**6851* Specifications for the Production of Highly-Stressed Cast-Steel Parts.** *Giesserei*, v. 40, no. 26, Dec. 24, 1953, p. 684-685.

Importance of suitable equipment and procedure for proper casting 6 ref.

**6852* Recent Development in Construction of Pressure Casting Machine.** (German.) F. Richter. *Giesserei*, v. 41, no. 1, Jan. 7, 1954, p. 2-6.

Superiority of horizontal piston arrangement; advantages and disadvantages of different ways of closing the mold; design and operation of new type machine. Diagrams, graph, photographs.

**6853* Difference Between Hematite Pig Iron Cast in Sand and Chill Molds and Possibilities of Influencing the**

**Structure of Chill-Mold-Cast Pig Iron.** (German.) J. Willems, W. Lückerath, and H. Schroer. *Giesserri*, v. 41, no. 1, Jan. 7, 1954, p. 7-13; disc., p. 13-14.

Structure can be controlled by changing cooling rate. Photographs, graphs, micrographs.

**6854* Evaluating Quality of Core Binders on Basis of Laboratory Tests.** (German.) A. Pack. *Giesserei*, v. 41, no. 2, Jan. 21, 1954, p. 33-38.

Tests on various sand core binders. Tables, graphs, photographs. 3 ref.

**6855* Cupola-Furnace Operation. Hot Blast, Basic Cupola Furnace.** (German.) E. Piwowarsky. *Giesserei*, v. 41, no. 2, Jan. 21, 1954, p. 41-42.

Patented operation of basic-lined cupola furnaces with hot blasts up to 700 C. 4 ref.

**6856* Combustion Processes in the Cupola Furnace.** (German.) H. Schiffers. *Giesserei*, v. 41, no. 2, Jan. 21, 1954, p. 42-44.

Reaction and equilibria of various gases with the carbon in the cupola furnace. Graphs. 16 ref.

**6857* The Design of Modern Hot-Blast Cupola Furnaces With Consideration of New Metallurgical Information.** (German.) S. Tunder. *Giesserei*, v. 41, no. 2, Jan. 21, 1954, p. 44-45.

Features of modern cupola with respect of throat-gas exhaust, furnace charge intake, tuyeres, and water cooling. Diagram.

**6858* Computing Combustions and Determining the Functional Dependence of Variables in Cupola Melting With the Aid of Graphs.** (German.) W. Matejka. *Giesserei*, v. 41, no. 2, Jan. 21, 1954, p. 45-46.

Importance of monograms for determining operating conditions of hot-blast cupola furnaces. Graphs. 4 ref.

**6859* Basic Cupola Furnaces.** H. Schmidt. *Giesserei*, v. 41, no. 2, Jan. 21, 1954, p. 46-47.

Effect of amount of coke and lime stone on composition of melt and slag. Tables. 3 ref.

**6860* Pick-Up and Loss Conditions in Cupola Melting With Hot Blast.** (German.) E. Piwowarsky and H. Schiffers. *Giesserei*, v. 41, no. 2, Jan. 21, 1954, p. 47-49.

Melting with hot blast reduces loss of elements accompanying the charge because of a lower wind zone. Higher furnace temperature increases solvent power of Fe and changes composition of the slag and its reactivity with the melt and furnace lining. Graph. 2 ref.

**6861* Basic Melting.** (German.) O. Günthner. *Giesserei*, v. 41, no. 2, Jan. 21, 1954, p. 49.

Advantages considered in steel melting in basic-lined hot-blast cupola furnaces.

**6862* Three Years Plant Experience With Addition of Oxygen to the Cupola Furnace.** (German.) F. Brügger. *Giesserei*, v. 41, no. 2, Jan. 21, 1954, p. 49-50.

Equipment and procedure of melting with $O_2$-enriched blast and its economy. Graphs.

**6863* Removal of Gases in Gray-Iron Casting.** (German.) A. Schmitz. *Giesserei*, v. 41, no. 2, Jan. 21, 1954, p. 51-52.

Measures designed to allow gases to escape from green- and dry-sand molds. Diagrams.

**6864 Cut Tool Costs, Simplify Design With Precision Casting.** Stanley Snorek. *Iron Age*, v. 173, Feb. 11, 1954, p. 136-139.

Costs of making identical tools and fixtures for assembly operations substantially reduced through wider use of precision casting methods. Photographs.

**6865 Diecastings. Industry Uses More for Working Parts.** J. J. Obrzut. *Iron Age*, v. 173, Feb. 11, 1954, p. 140-143.

Diecasting provides a low cost method of making complex parts to close tolerances at high production rates. Photographs.

**6866 Solidification of Steel. IV.** T. B. King. *Iron & Steel*, v. 27, Jan. 1954, p. 15-22.

Developments in methods of casting. Table. 81 ref.

**6867 Pressure-Pouring Steel Car Wheels.** E. Q. Sylvester. *Mechanical Engineering*, v. 76, Feb. 1954, p. 152-158.

New process involves permanent molds machined from graphite. Photographs, table, diagrams, graph, photo-micrographs.

**6868 Founding Magnesium-Base Alloys. I. Shrinkage Porosity. II. Methods of Chilling. III. Risers. IV. Casting Design.** M. Caillon. *Metal Industry*, v. 84, Jan. 1, p. 3-5; Jan. 8, p. 25-26; Jan. 15, p. 43-45; Jan. 22, 1954, p. 70-72.

Includes diagrams, photographs, graphs. (To be continued.)

**6869* Status of Measuring Temperature by Immersion in Foundaries.** (German.) Kurt Guthmann. *Stahl und Eisen*, v. 73, no. 26, Dec. 17, 1953, p. 1693-1703; disc., p. 1703-1705.

Published reports and research results on optical immersion pyrometers, immersion thermocouples, and methods of measuring temperature of melts. Diagrams, photographs, tables, graphs. 141 ref.

**6870* Equipping a Modern Laboratory With Air Conditioning.** (Germany.) Erich Piper and Heinz Hagedorn. *Stahl und Eisen*, v. 73, no. 26, Dec. 17, 1953, p. 1720-1727.

Design and equipment of a modern foundry laboratory. Special emphasis is given to air conditioning. Diagrams, tables, graph, photographs.

**6871* Advances in Foundry Practice in the First Half Year of 1953.** (German.) Paul A. Heller. *Stahl und Eisen*, v. 74, no. 1, Jan. 1, 1954, p. 35-39; no. 2, Jan. 14, 1954, p. 160-107.

Reviews literature on solubility of carbon in molten iron; effect of silicon and manganese; mathematics of melting practice; composition and structure of molds; and various other works on foundry practice. Tables, graphs, diagrams, photomicrographs. 98 ref.

**6872* Investment Casting. When and How to Use It.** Edward Engel. *Tool Engineer*, v. 32, Feb. 1954, p. 77-80.

Production and design problems. Photographs.

***See also:***
**7170** (quality control in foundry)

## METALS—HEAT TREATMENT

**6873* Effect of Prebaking in Malleablizing Iron.** Floyd Brown. *American Foundryman*, v. 25, Feb. 1954, p. 50-51.

Prebaking hard Fe forms graphite nuclei. This does not require H which, in fact, inhibits the prebaking effect. Graph, table. 6 ref.

**6874* Spectrographic Determination of Surface Carburization and Decarburization.** (German.) Werner Liedtke. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 11-12, Nov.-Dec. 1953, p. 465-467.

Improved method and results. Photograph, micrographs, graph, spectrogram, table.

**6875* Hardenability of Different Commnoly Used Structural Steels According to Jominy Quench Test.** (German.) Heinz Kiessler and Karl Schweyher. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 11-12, Nov.-Dec. 1953, p. 475-481.

Divergence in hardness curve due to sampling was shown to be very small indicating reliability of Jominy test. Table, graphs. 10 ref.

**6876* High-Temperature High-Vacuum Furnace.** H. W. Davidson and T. H. Burwood. *Engineering*, v. 177, Jan. 22, 1954, p. 106-108.

Simple design for heat treatment up to 2,200 C. Photographs, graph, diagrams. 6 ref.

**6877* Inductive Surface Hardening of Cast Steel.** (German.) G. W. Seulen. *Giesserei*, v. 41, no. 2, Jan. 21, 1954, p. 40-41.

Surfaces of steel heated by induction and quenched can be

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hardened to depth of 1 to 8 mm. and hardness of 55 to 60 Rockwell.

**6878 Continuous Heat Treatment of Non-Ferrous Strip by Transverse Flux Induction Heating. II.** Robert M. Baker. *Industrial Heating*, v. 21, Jan. 1954, p. 56, 58, 60, 62, 66, 68, 146.

Design and operating experience with transverse flux coils. Photographs.

**6879 Nitriding Improves Titanium Properties. II.** J. L. Wyatt and N. J. Grant. *Iron Age*, v. 173, Jan. 28, 1954, p. 124-127.

Increased hardness, resistance to galling, improved creep rupture properties, and better oxidation resistance. Graphs, tables.

**6880* Electric Furnaces With a Controlled Atmosphere.** (French.) Marcel Chain. *Journal du Four Electrique*, v. 62, no. 6, Nov.-Dec. 1953, p. 169-175; disc., p. 175-176.

Atmospheres and equipment are described. Graphs, diagrams, photographs.

**6881 Heat Treatment, Structure, and Mechanical Properties of Ti-Mn Alloys.** F. C. Holden, H. R. Ogden, and R. I. Jaffee. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 169-184.

Factors affecting mechanical properties of $\beta$-stabilized Ti alloys. Principal compositional factors were found to be solid-solution strengthening, martensitic transformation, and instability of $\beta$ phase. Structural factors, such as grain size and shape, were found to have more influence on ductility and toughness than on strength. Graphs, micrographs, tables, photographs. 4 ref.

**6882 Heat Treatment of Titanium Generalized in Terms of Beta Prime.** Leonard D. Jaffe. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 210.

Guide for practical heat treatment. Graph. 9 ref.

**6883 Annealing of a Cold Rolled Aluminum Single Crystal.** A. H. Lutts and P. A. Beck. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 257-260.

Experimental procedures and results. Graphs, photographs. 14 ref.

**6884* The Design and Construction of Inductors.** D. Warburton-Brown. *Mechanical World and Engineering Record*, v. 134, Jan. 1954, p. 11-19.

Practical design of coils to suit a variety of work-pieces and useful notes on making coils. Diagrams, photographs, graph.

**6885 Effective Heat Treatment of Molybdenum.** T. G. Perry, H. S. Spacil, and John Wulff. *Metal Progress*, v. 65, Feb. 1954, p. 75-77.

Experimental results of applications above 1500 F. Micrographs.

**6886 Dew Point—A Means of Measuring the Carbon Potential of Prepared Atmospheres.** Norbert K. Koebel. *Metal Progress*, v. 65, Feb. 1954, p. 90-96, 96B, 172.

Results of a study and its advantages. Diagram, table, micrograph, graphs, photograph.

**6887 Heat-Treatment of High-Speed Steel. I. Introduction and General Outline of Techniques.** S. G. Cope. *Metal Treatment and Drop Forging*, v. 21, Jan. 1954, p. 3-10.

Introduction and development of high-speed steels; standard hardening treatments; and factors influencing microstructure and properties of the steel. Graphs, photomicrographs. 10 ref.

**6888* Machined Parts and Their Dimensional Control in Heat Treatment. II.** Howard Boyer. *Modern Machine Shop*, v. 26, Feb. 1954, p. 132-143.

Dimensional changes produced in machined parts during heat treatment. Graph, photograph, drawings, table.

**6889 Heat Treatment of Aircraft Parts.** Frank Crahen. *Steel Processing*, v. 40, Jan. 1954, p. 48-49, 58.

Equipment and processes for carburizing, hardening, and annealing steel parts. Photograph, table.

**6890* Production Changes at Riverbank.** *Western Machinery and Steel World*, v. 45, Jan. 1954, p. 92-94.

Equipment, plant layout, and operating procedures for large western spheroidizing plant. Photographs.

***See also:***
**7011** (heat treating of cartridge cases)

## METALS—MECHANICAL AND PHYSICAL PROPERTIES

**6891 The Influence of Cold Work and Radiation Damage on the Debye Temperature of Copper.** (English.) D. Bowen and G. W. Rodeback. *Acta Metallurgica*, v. 1, no. 6, Nov. 1953, p. 649-653.

Simultaneous measurements of resistance on a damaged wire and a well-annealed wire. Differing behavior of temperature-dependent portions of resistivities has been interpreted as a decrease of Debye temperature in damaged sample. Graphs, diagram. 7 ref.

**6892 Cleavage Deformation in Zinc and Sodium Chloride.** (English.) P. L. Pratt. *Acta Metallurgica*, v. 1, no. 6, Nov. 1953, p. 692-699.

Flat surfaces prepared by cleavage of single crystals show deformation markings associated with propagation of the cleavage crack. Micrographs, diagrams. 11 ref.

**6893 Magnesium-Cadmium Alloys. V. Low Temperature Heat Capacities and a Test of the Third Law of Thermodynamics for the MgCd Superlattice.** C. B. Satterthwaite, R. S. Craig, and W. E. Wallace. **VI. Heat Capacities Between 12 and 320° K. and the Entropies at 25° of Magnesium and Cadmium.** R. S. Craig, C. A. Krier, L. W. Coffer, E. A. Bates, and W. E. Wallace. **VII. Low Temperature Heat Capacities of $MgCd_3$ and $Mg_3Cd$ and a Test of the Third Law of Thermodynamics for the $MgCd_3$ Superlattice.** L. W. Coffer, R. S. Craig, C. A. Krier, and W. E. Wallace. *American Chemical Society, Journal*, v. 76, Jan. 5, 1954, p. 232-244.

Apparatus, techniques, and results. Diagrams, tables. 38 ref.

**6894* The Effect of Chemical Compositon of Unkilled Aged Steels on Notch Impact Strength.** (German.) Heinz Kornfeld. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 11-12, Nov.-Dec. 1953, p. 469-474.

Impact-temperature curves of 234 steels show that effects of composition can be reduced to mathematical formulas. Tables, graphs. 5 ref.

**6895* Permanent Magnets of Barium Oxide and Trivalent Iron Oxide.** (German.) Hermann Fahlenbrach and Walter Heister. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 11-12, Nov.-Dec. 1953, p. 523-527; disc., p. 527-528.

Reviews literature on magnetic properties, advantages, disadvantages, and application. Graphs, photographs. 23 ref.

**6896* The Effect of Manganese, Nickel, and Vanadium Together With Carbon on Wearing Behavior of Normalized Steels.** (German.) Heinrich Arend. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 11-12, Nov.-Dec. 1953, p. 529-533.

Experimental arrangement and results of wear tests. Tables, diagrams, graphs. 6 ref.

**6897* The Structure of Surfaces and the Mechanism of Friction.** J. W. Menter. *Birmingham Metallurgical Society, Journal*, v. 33, Sept. 1953, p. 97-118.

Experimental work contributed to theories presented. Micrographs, graphs, tables, diagrams.

**6898* Scatter of Results of Creep-Rupture Tests on Heat-Resisting Steels.** H. Zschokke. *Brown Boveri Review*, v. 40, nos. 5-6, May-June 1953, p. 199-209.

Measured rupture strengths are liable to varying degrees of scatter. Photograph, graphs, tables.

**6899 Procedure for Determining the Hardness Variation Pattern of Alpha and Gamma Phases in Steel Being Heated in Vacuo to 2000° F.** M.G. Lozinskii. *Henry Brutcher, Altadena, Cal., Translation no.* 3045, 7 p. (From *Doklady Akademii Nauk SSSR*, v. 84, no. 1, 1952, p. 63-66.)

Apparatus and hardness measuring technique. Diagram, graph. 4 ref.

**6900* Martensite Formations on Wire Rope.** C. M. Zerr. *Drilling*, v. 15, Feb. 1954, p. 61-63, 118.

Scattered spasmdoic breaks that appear on wire rope operating standard, properly designed and maintained sheaves.

**6901 The Behaviour of Thick-Walled Cylinders Under Very High Pressures.** L. Deffet and J. Gelbgras. *Engineers' Digest*, v. 15, Jan. 1954, p. 17-19. (Translated from *Revue Universelle des Mines*, ser. 9, v. 9, no. 10, Oct. 1953, p. 725-140.)

Previously abstracted from original. See item 2390, v. 3, Feb. 1954. Tables, photographs, diagram, graph. 4 ref.

**6902* Investigation of the Mechanism of Electric Conductivity of Gray Tin.** (German.) G. Busch and J. Wieland. *Helvetica Physical Acta*, v. 26, nos. 7-8, Sept.-Oct. 1953, p. 697-730.

Results are interpreted by existing theory. Absolute value was determined. Tables, graphs. 18 ref.

**6903 Plated Locknuts Reduce Galling in Titanium Bolts.** R. A. Baughman. *Iron Age*, v. 173, Feb. 11, 1954, p. 134-135.

Tests to determine relaxation and galling characteristics of Ti bolts. Best bolt service obtained by using Ag-plated locknuts in combination with rolled threads on bolts. Tables.

**6904 Thermal Diffusivity of Metals at High Temperatures.** P. H. Sidles and G. C. Danielson. *Journal of Applied Physics*, v. 25, Jan. 1954, p. 58-66.

Modified Angström for measuring thermal diffusivity and hence thermal conductivity of metals has been developed. Photographs, diagrams, graphs. 13 ref.

**6905 A Method of Measuring Magnetostriction.** A. W. Cochardt. *Journal of Applied Physics*, v. 25, Jan. 1954, p. 91-95.

Values derived from torsion tests made on wires of various ferromagnetic materials. Graphs, diagram, table. 11 ref.

**6906 Some Magnetostriction Relations in Materials Possessing Preferred Domain Orientations.** George T. Rado. *Journal of Applied Physics*, v. 25, Jan. 1954, p. 102-106.

Relations between magnetostricitve strains are derived for polycrystalline ferromagnetic materials. Tables, diagram. 9 ref.

**6907 Nuclear Magnetic Resonance in Metals. II. Temperature Dependence of the Resonance Shifts.** B. R. McGarvey and H. S. Gutowsky. *Journal of Chemical Physics*, v. 21, Dec. 1953, p. 2114-2119.

Temperature dependence of nuclear resonance shift in metals was investigated in Li, Na, Rb, Cs, and Ga. Graphs. 20 ref.

**6908 Some Properties of Sodium and Potassium Near Their Melting Points.** L. G. Carpenter. *Journal of Chemical Physics*, v. 21, Dec. 1953, p. 2244-2245.

Examines common model for resistance, diffusion, and specific heat phenomena. Graphs. 8 ref.

**6909 Mechanism of Plastic Flow in Titanium: Manifestations and Dynamics of Glide.** F. D. Rosi. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Jan. 1954, p. 58-69.

Slip and twinning behavior in extended Ti crystals and formation and appearance of coarse kink bands. Diagrams, micrographs, table. 29 ref.

**6910 Creep Correlations of Metals at Elevated Temperatures.** Oleg D. Sherby, Raymond L. Orr, and John E. Dorn. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Jan. 1954, p. 71-80.

Application of correlations to data for Al, Fe, Ni. Cu, Zn, Pt, Au, Pb, and simple alloys. Graphs, tables. 22 ref.

**6911 Observations on Elevated-Temperature Tensile Deformation.** R. W. Guard, J. H. Keeler, and S. F. Reiter. *Journal of Metals* v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 226-227.

Results of experimental studies on effects of prior cold work and strain rate on Zr and alloy steel. Graphs. 3 ref.

**6912 High Temperature Strength of Wrought Aluminum Powder Products.** Eric Gregory and Nicholas J. Grant. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 247-252.

Creep rupture properties of wrought Al powder products made from five grades of sintered Al powder investigated at temperatures from 400 to 900 F for rupture times up to 1000 hr. Table, diagram, graphs, micrographs. 16 ref.

**6913 Effect of Stress on the Creep Rates of Polycrystalline Aluminum Alloys Under Constant Structure.** O. D. Sherby, R. Frenkel, J. Nadeau, and John E. Dorn. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 275-279.

Method for study of creep rate dependence of metals on applied stress under condition of constant structure, was applied to pure Al and to dilute solid solution alloys of Mg, Cu, Ge, Zn, and Au in Al. Graphs, table. 17 ref.

**6914 Plasticity of Molybdenum Single Crystals at High Temperatures.** R. Maddin and N. K. Chen. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 280-284.

Single crystals of Mo were extended at temperatures from 1300 to 2500 C. It was found that with increasing temperatures, yield becomes more pronounced and number of slip bands for equal amounts of elongation decreases. Slip, at high temperatures, fragments the structure. Graphs, diagram, micrographs, tables. 10 ref.

**6915 Hydrogen Embrittlement of Steels.** Jack T. Brown and William M. Baldwin, Jr. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 298-303.

Investigates a fuller characterization of effects of varying temperature and strain rate on fracture strain of hydrogen-charged steel. Graphs, diagrams. 12 ref.

**6916 On the Torsional Deformation and Recovery of Single Crystals.** S. S. Hsu and B. D. Cullity. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 305-312.

Stress distribution at surface of a twisted cylinder is analyzed along boundary of a slip plane of arbitrary orientation. This analysis is applied to torsion of cylindrical crystals of Mg and Al. Photographs, tables, diagrams, graphs. 10 ref.

**6917* A New Theory of Metal Transfer & Wear.** I-Ming Feng. *Lubrication Engineering*, v. 10, Feb. 1954, p. 34-38.

Mechanical interlocking as primary, and adhesion or diffusion as secondary causes of metal transfer and wear. Diagrams. 12 ref.

**6918* The Bauschinger Effect and Its Practical Results.** (German.) W. Späth. *Metall*, v. 8, nos. 1-2, Jan. 1954, p. 25-29.

Monocrystals retain internal stresses even when a displacement was migrated through entire flow area. Effects of cold working. Graphs. 11 ref.

**6919 Dislocations or What Makes Metals So Weak?** W. T. Read, Jr. *Metal Progress*, v. 65, Feb. 1954, p. 101-106, 168, 170, 172.

Crystal structure and defects or imperfections which permit plastic deformations. Diagrams, photograph.

**6920 Frictional Properties of Titanium and Its Alloys.** E. Rabinowicz. *Metal Progress*, v. 65, Feb. 1954, p. 107-110.

Severe galling and metal transfer were noted in sliding applications and high rates of wear in related operations of cutting, drawing and grinding. Diagram, photomicrographs, tables, graph.

**6921 Comparative Fatigue Tests With 24 S-T Alclad Riveted and Bonded Stiffened Panels.** J. H. Rondeel, R.

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Kruithof, and F. J. Plantema. *Netherlands National Luchtvaartlaboratorium Report* S. 416, Dec. 1952, p. S1-S14. (TL526.N3 N38.5r)

Fatigue strengths of bonded and riveted flat sheet-stringer panels of identical construction except for the sheet-stringer joints. Results of fatigue tests on panels stiffened with angle section stringers and top-hat stringers. Graphs, diagrams, tables, photographs.

**6922 Note on the General Stress-Strain Relations of Some Ideal Bodies Showing the Phenomena of Creep and of Relaxation.** J. P. Benthem. *Netherlands National Luchtvaartlaboratorium Report* S. 426, p. S15-S23. (TL526.N3 N38.5r)

General stress-strain relations of isotropic linear bodies and viscosity phenomena which may accompany plastic deformation. Diagrams. 7 ref.

**6923* Microscopic Studies on Deformed ZnS-Crystals.** E. Votava, S. Amelinckx, and W. Dekeyser. *Physica*, v. 19, no. 12, Dec. 1953, p. 1163-1172.

An optical and interometric study of (111) faces of ZnS crystals grown at relatively high temperature. Micrographs, diagrams. 9 ref.

**6924* The Anomalous Skin Effect and the Reflectivity of Metals. IV. Theoretical Optical Properties of Thin Metallic Films.** (English.) R. B. Dingle. *Physica*, v. 19, no. 12, Dec. 1953, p. 1187-1199.

Reflection, transmission, and adsorption coefficients of a thin metallic film may be determined theoretically when due account is taken of anomalous nature of skin effect. Table. 9 ref.

**6925 The $d^3$ and $d^1$ Configurations of Vanadium.** Sydney Meshkov. *Physical Review*, v. 93, ser. 2, Jan. 15, 1954, p. 270-272.

Term values of $d^3$ configuration of V III are calculated using experimentally observed energies of $d^1$ configuration of V II. An iterative type calculation is then made for term values of $d^1$ in terms of both experimental energies of $d^3$ and calculated values of the still unidentified terms of $d^3$. Each of these calculations leads to an appreciable improvement of the agreement between calculated and observed energies. Tables. 6 ref.

**6926 Momentum Distribution of Electrons in Solids: Results for Some Metals Using the Thomas-Fermi Method.** N. H. March. *Physical Society, Proceedings*, v. 67, no. 409A, Jan. 1954, p. 9-16.

Experiments show momentum distribution of electrons in metallic Li and Be differs from that given by wave-mechanical calculations. Graphs. 12 ref.

**6927 The Magnetic Susceptibility of Metallic Uranium.** L. F. Bates and D. Hughes. *Physical Society, Proceedings*, v. 67, no. 409B, Jan. 1954, p. 28-37.

Sudden changes in susceptibility accompany the $\alpha$-$\beta$ and $\beta$-$\gamma$ phase changes at 600 and 767 C respectively. Diagram, graphs, tables. 12 ref.

**6928 Intrinsic Magnetization in Platinum Cobalt Alloys.** A. W. Simpson and R. H. Tredgold. *Physical Society, Proceedings*, v. 67, no. 409B, Jan. 1954, p. 38-41.

Effect of heat treatment on alloys containing small percentages of Co. Graphs. 6 ref.

**6929 Correlation Energy in Metals and the Cohesive Energy of Metallic Sodium.** S. Raimes. *Physical Society, Proceedings*, v. 67, no. 409A, Jan. 1954, p. 52-56.

Method of Wigner and Seitz for calculating cohesive energy of metallic Na is compared with a recent method of Löwdin. Graphs. 10 ref.

**6930* Production of Silicon Sheets of High Initial Permeability.** (Polish.) M. Markuszewicz and A. Zawada. *Prace Instytutow Ministerstwa Hutnictwa*, v. 5, no. 5, Sept.-Oct. 1953, p. 259-276.

Properties of Si sheets for use in tele-communication systems. Effect of metallurgical and structural factors on magnetic permeability in low fields. Tables, graphs, micrograms, diagram. 17 ref.

**6931* Apparatus for Determination of Magnetic Anisotropy.** (Polish.) L. Kozlowski, M. Poziomska, and E. Romer. *Prace Instytutow Ministerstwa Hutnictwa*, v. 5, no. 5, Sept.-Oct. 1953, p. 277-284.

Operating principles of apparatus designed to establish torque diagrams and texture of disks of cold rolled Si strips. Graphs, tables, photographs, diagrams. 16 ref.

**6932* Some Experimental Data Concerning the Schnadt Resilience Tests.** (French.) R. Vancrombrugge. *Revue de la Soudure (Brussels)*, v. 9, no. 4, 1953, p. 207-213.

Results of tests depending on gradient of stress, velocity of deformation, and nature of stress. Photographs, tables, graphs.

**6933* Effect of Aging at 80° C on Mechanical Properties of Armco Iron and a 0.16% Carbon Steel.** (French.) H. Hendus and H. Röhrig. *Revue de métallurgie*, v. 50, no. 12, Dec. 1953, p. 839-843.

Effect of aging on hardness,, elastic limit, tensile strength, and work-hardening. Graphs. 12 ref.

**6934* The Transition Zone of Resilience of Mild Steels.** (French.) J. Ulmo, F. Bastenaire, and R. Borione. *Revue de métallurgie*, v. 50, no. 12, Dec. 1953, p. 868-887.

Statistical study of distribution of impact strengths and lateral contractions at base of a notch at various temperatures reveals existence of two types of rupture in transition zone. Graphs, tables.

**6935 The Propagation of Electrons in a Strained Metallic Lattice.** S. C. Hunter and F. R. N. Nabarro. *Royal Society, Proceedings*, v. 220, ser. A, Dec. 22, 1953, p. 542-561.

Propagation of electrons in a strained metallic medium was studied by a technique in which perturbing potential is proportional to elastic strain. Electrical resistivity caused by dislocations is calculated for Cu and Na. Graph. 17 ref.

**6936 The Effect of Static and Dynamic Loading and Temperature on the Yield Stress of Iron and Mild Steel in Compression.** J. M. Krafft, A. M. Sullivan, and C. F. Tipper. *Royal Society, Proceedings*, v. 221, ser. A, Jan. 7, 1954, p. 114-127 + 2 plates.

Cylindrical test samples were compressed statically and dynamically at temperatures ranging from + 100 to −195 C. Yield stress, form of yield, and surface markings were observed. Diagrams, micrographs, graphs. 8 ref.

**6937* Microhardness Testing in Theory and Practice.** (German.) E. M. Onitsch-Modl. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 19, no. 11, Nov. 1953, p. 330-343.

Theory, application, and results. Graphs, micrographs, tables. 38 ref.

**6938* Problems of Hardness Testing of Thin Sheet Metals.** E. Börje Bergsman. *Sheet Metal Industries*, v. 31, no. 321, Jan. 1954, p. 5-14.

Micro-hardness and problems arising from testing sheet and foil are discussed. Graphs, photomicrographs, table. 37 ref.

**6939 A Study of Residual Stresses in Flat Beams by Electropolishing Methods.** D. J. Demorest and D. O. Leeser. *Society for Experimental Stress Analysis, Proceedings*, v. 11, 1953, p. 45-54.

Removal of successive thin, uniform layers of surface material with minimum effect to residual stresses under consideration. Diagrams, tables. 9 ref.

**6940 Effects of Plastic Flow and Work-Hardening in the Experimental Stress Analysis of Magnesium-Alloy Parts.** E. H. Schuette. *Society for Experimental Stress Analysis, Proceedings*, v. 11, 1953, p. 81-96.

Results of tests on a sand-cast Mg alloy giving quantitative illustrations of phenomena involved. Their significance in stress-analysis techniques is discussed. Graphs, tables. 7 ref.

**6941 Photoelasticity—A Precision Instrument of Stress Analysis.** M. M. Forcht, R. Guernsey, Jr., and D. Landsberg. *Society for Experimental Stress Analysis, Proceedings*, v. 11, 1953, p. 105-112; disc., p. 113-114.

Salient characteristics of technique are briefly reviewed. Graphs, table, stress patterns. 11 ref.

**6942 A New Electric Resistance Strain Gauge for Large Strain.** N. L. Svensson. *Society for Experimental Stress Analysis, Proceedings*, v. 11, 1953, p. 197-202.

Deals with development of a new type of unbonded electric resistance strain gage designed to measure strains up to 8 or 10%, and yet be in a position to measure elastic strains resulting from unloading the speciman. Diagrams, graphs.

**6943* Hot-Work Tool Steels.** (German.) Hermann M. Hiller. *Stahl und Eisen*, v. 73, no. 24, Nov. 19, 1953, p. 1565-1574.

Required properties of tool steels; methods of determining these properties; effects of different alloying elements; and application of heat-resistant tool steels. Tables, graphs. 29 ref.

**6944* Composition and Strength of Structural Steels for Bridges From the Period 1870-1880.** (German.) Ernest Hermann Schulz and Wilhelm Bischof. *Stahl und Eisen*, v. 73, no. 24, Nov. 19, 1953, p. 1583-1590.

Results reveal that puddled steel is unsatisfactory for bridge building. Bessemer steels were found to be better but still below present standards. Tables, graphs. 11 ref.

**6945* Development and Status of Soft-Magnetic Materials.** (German.) Hermann Fahlenbrach and Walter Heister. *Stahl und Eisen*, v. 73, no. 25, Dec. 3, 1953, p. 1644-1652.

Literature review, effects of composition, purity, and field strength on magnetic properties of metals and oxides. Graphs, diagrams. 81 ref.

**6946* Hardenability and Strength Properties of Alloyed Structural Steels.** (German.) Karl Bungardt, Heinz Kiessler, and Ernst Kunze. *Stahl und Eisen*, v. 74, no. 2, Jan. 14, 1954, p. 71-76.

Correlation between hardenability and tensile and notch-impact strength of 12 steels was studied. Tables, graphs. 18 ref.

**6947* Creep of Steel Wires in Tensile Fatigue Region.** (German.) Rudolf Zinsser. *Stahl und Eisen*, v. 74, no. 3, Jan. 28, 1954, p. 145-151.

Steel with 0.39 to 0.76% carbon in form of drawn or heat treated wires was investigated. Photograph, tables, graphs, micrographs. 9 ref.

**6948* Hardness Testing Equipment and Methods.** John E. Hyler. *Tooling and Production*, v. 19, Dec. 1953, p. 64, 75, 78, 104-108.

Includes photographs.

**6949 Data on the Compressive Strength of Skin-Stringer Panels of Various Materials.** Norris F. Dow, William A. Hickman, and B. Walter Rosen. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3064, Jan. 1954, 49 p. (TL570 Un3t)

Flat skin-stringer compression panels of stainless steel, mild steel, Ti, Cu, four Al alloys, and a Mg alloy were tested. Graphs, photograph, diagram, tables. 19 ref.

**6950 Fatigue Tests at Stresses Producing Failure in 2 to 10,000 Cycles. 24S-T3 and 75S-T6 Aluminum-Alloy Sheet Specimens With a Theoretical Stress-Concentration Factor of 4.0 Subjected to Completely Reversed Axial Load.** Herbert F. Hardrath and Walter Illg. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3132, Jan. 1954, 14 p. (TL570 Un3t)

Notched specimens were subjected to completely reversed axial loads. Failures occurred in less than 50 cycles at two-thirds of static tensile strength and in as few as 2 cycles when applied load was near static strength of specimen. Graphs, tables, photograph. 7 ref.

**6951 Creep Bending and Buckling of Linearly Viscoelastic Columns.** Joseph Kempner. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3136, Jan. 1954, 22 p. (TL570 Un3t)

General dynamic equation of creep bending of a beam loaded laterally and axially was derived for a linearly viscoelastic material whose mechanical properties can be characterized by four parameters. Graphs, diagrams. 10 ref.

**6952 Creep Bending and Buckling of Nonlinearly Viscoelastic Columns.** Joseph Kempner. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3137, Jan. 1954, 27 p. (TL570 Un3t)

Differential equations of bending of an idealized H-section beam column were derived for a nonlinearly viscoelastic material whose mechanical properties are analogous to a model consisting of a linear spring in series with a nonlinear dashpot whose strain rate is proportional to a power of the applied stress. Graphs, diagrams, tables. 11 ref.

**6953 Creep Buckling of Columns.** Joseph Kempner and Sharad A. Patel. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3138, Jan. 1954, 24 p. (TL570 Un3t)

Formulas for determination of creep deflection-time characteristics of an initially curved idealized H-section column. Graphs, diagrams, tables. 5 ref.

**6954 The Plastic Fatigue Strength of Pressure Vessel Steels.** J. H. Gross, D. E. Gucer, R. D. Stout. *Welding Journal*, v. 33, Jan. 1954, p. 31S-39S.

Strain behavior, surface preparation, testing temperature, welding, and heat treatments. Diagrams, photographs, graphs, tables.

**6955* Laws of Plastic Deformation of Metals Under a Multiaxial State of Stress. II. Tensile and Torsion Experiments on Aluminum Cylinders.** (German.) Werner Sautter, Albert Kochendörfer, and Ulrich Dehlinger. *Zeitschrift für Metallkunde*, v. 44, no. 12, Dec. 1953, p. 553-565.

Describes equipment. Results agree with theory of flow, plasticity, and deformation. Photographs, diagrams, graphs. 8 ref.

**6956* Problem of Activation of Metal Surfaces.** (German.) Cyrill Schaub and Werner Liedtke. *Zeitschrift für Metallkunde*, v. 44, no. 12, Dec. 1953, p. 570-572.

Blackening of photographic plate in an electric field is due partly to electron emission and partly to $H_2O_2$ formed by chemosorption during cold working of metals. Photographs. 7 ref.

**6957* The Properties of Metal Melts. VIII. The Density of Molten Aluminum and Several Aluminium Alloys.** (German.) Erich Gebhardt, Manfred Becker, and Stefan Dorner. *Zeitschrift für Metallkunde*, v. 44, no. 12, Dec. 1953, p. 573-575.

Results of density determinations on pure Al and Al-Cu, Al-Fe, and Al-Ti alloys performed by the buoyancy process in salt melt of known density. Graphs, tables.

*Books and Miscellaneous Publications*

**6958 An Investigation Into the Plastic Bending of Aluminum Alloy Beams.** J. B. Dwight. Aluminum Development Assn., Research Report no. 16, 1953, 68 p. (TA480.A6 AL82r)

Investigations into flexural behavior of Al beams, with the object of providing information for any subsequent development of a plastic design method for Al structures. Diagrams, graphs, photographs, tables. 20 ref.

**6959 The Behaviour of Aluminum Alloy Riveted Joints.** A. J. Francis. Aluminum Development Assn., Research Report no. 15, 1953, 95 p. (TA480.A6 AL82r)

Behavior of double-shear joints subjected to static loading, applied either axially or eccentrically, is considered theoretically both in elastic range and beyond. It is found that under elastic conditions, partition of load among the rivets of a joint is less uniform than is assumed in conventional design, but that conditions gradually improve beyond the elastic range. Diagrams, photographs, graphs, tables. 16 ref.

**6960** (Plastic Deformation of Metals.) **Deformazioni Plastiche dei Metalli.** Sergio Descovich. v. I. 412 p. 1949. Instituto Siderurgico Finsider, Genoa, Italy. (QC191 D45d)

Includes chapters on "Homogenous Plastic Deformations of Single Crystals"; "Theory of Plastic Deformation of Single Crystals"; "Non-Homogeneous Deformations of Single Crystals. Alternating Deformations-Twinning"; "Plastic Deformations of Poly-Crystals"; "Creep in Polycrystalline Metals"; "Textures From Plastic Deformations"; "Stresses and Strains-Mechanics of Continuous Systems"; "Relations Between Stresses at Yield-

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ing"; "Principles of the Mathematical Theory of Plasticity"; and "The Plastic Deformation in the Tensile Test". Graphs, photographs, diagrams, tables. 584 ref.

**6961 Applied Elasticity.** Chi-Teh Wang. 357 p. 1953. McGraw-Hill. (QC191 W18a)

Analysis of stress and strain; stress-strain relations and general equations of elasticity; plane-stress and plane-strain problems; torsion of various shaped bars; finite-difference approximations and relaxation method; energy principles and variational methods; solution by means of complex variables; bending and compression of bars; numerical method in determination of buckling loads; bending and buckling of thin plates; and theory of thin shells and curved plates.

**6962 The Hardness of Deuteron Irradiated Molybdenum.** I. G. Geib, R. E. Grace, and T. C. Harman. Paper from CONFERENCE ON NUCLEAR ENGINEERING, 1953 PROCEEDINGS. p. E11-E24. Sept. 9-11, 1953. Univ. of Calif., Berkeley. (QC776 C76p)

Effects of ambient vibrations, load, rate of loading, time of indentation, grain orientation, and surface conditions on Vickers hardness number were investigated. Graphs, tables. 18 ref.

**6963 The Effect of Lubrication and Nature of Superficial Layer After Prolonged Periods of Running.** F. T. Barwell. Paper from PROPERTIES OF METALLIC SURFACES, SYMPOSIUM. INSTITUTE OF METALS, MONOGRAPH AND REPORT SERIES 13. p. 101-122. 1953. Institute of Metals, London. (TS213 P94)

Various forms of wear; taper sections providing evidence that failure proceeds in stages; and microscopic evidence is given of plastic flow of metal adjacent to a rubbing surface. Graphs, micrographs, photographs. 30 ref.

**6964 The Crystalline Character of Abraded Surfaces.** P. Gay and P. B. Hirsch. Paper from PROPERTIES OF METALLIC SURFACES, SYMPOSIUM. INSTITUTE OF METALS, MONOGRAPH AND REPORT SERIES 13. p. 123-132; disc., p. 295-364. 1953. Institute of Metals, London. (TS213 P94)

Effect of various abrasive treatments on surface structure of calcite were investigated by X-ray and electron-diffraction methods. Tables, spectographs, graph. 20 ref.

**6965 The Effect of Surface Conditions on the Mechanical Properties of Metals, Mainly Single Crystals.** E. N. da C. Andrade. Paper from PROPERTIES OF METALLIC SURFACES, SYMPOSIUM. INSTITUTE OF METALS, MONOGRAPH AND REPORT SERIES 13. p. 133-143. 1953. Institute of Metals, London. (TS213 P94)

With single crystals of metal, a thin surface coating of oxide and possibly of other salts, markedly increases both critical shear stress and stress required to produce further strain after considerable glide has taken place. Graphs. 21 ref.

**6966 The Influence of Surface Condition on the Fatigue Strength of Steel.** R. J. Love. Paper from PROPERTIES OF METALLIC SURFACES. MONOGRAPH AND REPORT SERIES 13. p. 161-196. 1953. Institute of Metals, London. (TS213 P94)

Results have been obtained for carburizing, nitriding, cyaniding, flame-hardening, and cold working by rolling, pressing, or "presetting". Micrograph, tables. 157 ref.

**6967 The Influence of Surface Films on the Friction and Deformation of Surfaces.** F. P. Bowden and D. Tabor. Paper from PROPERTIES OF METALLIC SURFACES, SYMPOSIUM. INSTITUTE OF METAL, MONOGRAPH AND REPORT SERIES 13. p. 197-212; disc., p. 295-364. 1953. Institute of Metals, London. (TS213 P94)

In absence of all contaminating films, gross seizure occurs and sliding is impossible. At high speeds of sliding, high-temperature flashes are generated at regions of contact and the softened material is smeared over the surfaces to form Beilby layer. Graphs, micrographs, tables. 38 ref.

**6968 The Effect of Method of Preparation on the High-Frequency Surface Resistance of Metals.** R. G. Chambers and A. B. Pippard. Paper from PROPERTIES OF METALLIC SURFACES, SYMPOSIUM. INSTITUTE OF METALS, MONOGRAPH AND REPORT SERIES 13. p. 281-294; disc., p. 295-364. 1953. Institute of Metals, London. (TS213 P94)

High-frequency behavior of metal, particularly surface resistance, was determined by properties of thin surface layer of order micron in thickness. Graphs, table. 15 ref.

***See also:***

**6299** (strength of stainless steels)
**6300** (properties of chlorimet)
**6315** (strength of Ni cast iron)
**6688** (plastic flow around a notch)
**6694** (loading irregular shaped specimens)
**6702** (formulas for stress and strain)
**6879** (properties of nitrided Ti)
**7014** (properties of metal surfaces)
**7029** (physical properties of magnet materials)
**7074** (magnetic and thermal properties of Pd and Pd-Ag alloys)
**7078** (plasticity and crystal growth)
**7145** (cross sections for formation of $Na^{22}$)
**7337** (strength of weld joints)
**7365** (ductility transition of weld metal)
**7366** (fatigue strength in Al butt joints)

## METALS—MECHANICAL WORKING

**6969* Forming Magnesium-Alloy.** *Aircraft Production*, v. 16, Feb. 1954, p. 52.

Method for continuously heating work and dies during processing. Diagram.

**6970* Electro-Erosion Machining.** *Aircraft Production*, v. 16, Feb. 1954, p. 70-71.

Design and operating characteristics of new machine for automatic operation. Photographs, micrographs.

**6971 Cool Tip, Not Chip, With $CO_2$.** *American Machinist*, v. 98, Feb. 15, 1954, p. 130-133.

English technique applies coolant through lathe-tool shank, with reservoir under carbide tip and orifices aimed at work, not chips. Result is doubled or tripled cutting speeds. Photographs, diagram.

**6972 Low-Melting Alloys Provide Low-Cost Method to Spin Re-Entrant Shapes.** Denver Sams and Joseph Borodavchuk. *American Machinist*, v. 98, Feb. 15, 1954, p. 145-147.

When limited quantity limits chuck cost, cast alloy can be machined to shape parts that will not slip off the chuck. The spun shell can be removed when completed, by melting the chuck. Diagrams, photographs.

**6973 Cope Talks on Draw Dies. IX. Know the Wrinkles About Spherical Shells.** Stanley R. Cope. *American Machinist*, v. 98, Feb. 15, 1954, p. 148-152.

Knowledge of rules and suitable die design should eliminate drawing troubles. Diagrams.

**6974 Collected Papers 1953. Technical Papers and Panel Discussions, (Annual Vol.),** v. 21, 1953. Sections individually paged. American Society of Tool Engineers, Detroit.

Machinability, metal working, adhesives and tool applications. Papers are separately abstracted.

**6975 Structure as an Index to Machinability.** Norman Zlatin and John F. Kahles. *American Society of Tool Engineers, Technical Papers and Panel Discussion*, v. 21, 1953, 10 p.

Considerable savings in machining costs available to those who give thought to microstructure of metals they are machining. Table, micrographs, graphs.

**6976 Tool Engineering Applications of Titanium Carbide Alloys.** W. L. Kennicott. *American Society of Tool Engineers, Technical Papers and Panel Discussion*, v. 21, 1953, 7 p.

Compositons developed primarily for their heat resistant properties of high strength, thermal shock, and oxidation resistance at temperatures of 1600 F and above. Photographs, drawings, graph, table.

**6977 An Evaluation of Spinning vs. Drawing.** John W. Lengbride. *American Society of Tool Engineers, Technical Papers and Panel Discussion,* v. 21, 1953, 17 p.

Time and cost criteria and dimensional accuracy requirement are among the considerations in this comparison. Tables, graph, photographs, drawings.

**6978 Developments in Electrolytic Grinding.** L. H. Metzger. *American Society of Tool Engineers, Technical Papers and Panel Discussion,* v. 21, 1953, 10 p.

Essentials of process are presented with an over-all picture of its merits and applications. Drawing, photographs.

**6979 Some Basic Relations in Contour Forming.** George Sachs. *American Society of Tool Engineers, Technical Papers and Panel Discussion,* v. 21, 1953, 6 p.

Limitations of bending-type contour forming. Drawings, graphs.

**6980 Distribution of Shear-Zone Heat in Metal Cutting.** W. C. Leone. *ASME, Transactions,* v. 76, Jan. 1954, p. 121-124; disc., p. 124-215.

Expression for fraction of thermal energy developed at the shear zone in orthogonal metal cutting which is conducted back into work-piece. Diagrams, graph, tables. 15 ref.

**6981* A Complete Plant for the Manufacture of Soldering Wires.** Karl Drechsler. *Draht (English Ed.),* 1953, no. 17, Dec., p. 27-29.

Equipment and operating procedures including soldering wire press, coarse multiple drawing machine for soldering wire, multiple soldering wire drawing machine, and hand polishing machine. Photographs.

**6982* Vibrator Control of Tracer Drive.** S. H. Royer. *Electrical Manufacturing,* v. 53, Feb. 1954, p. 101-105.

Low contact pressures between stylus and template is achieved with new automatic tracer for flame-cutting machines. Photographs, diagrams.

**6983 Biggest Production Tool.** *Fortune,* v. 49, Feb. 1954, p. 123-128.

Air Force's 50,000-ton die-forging pres now being installed in Worcester, Mass. Photographs.

**6984 Forging Procedures for Stainless Steels. II.** Lester F. Spencer. *Industrial Heating,* v. 21, Jan. 1954, p. 44-46, 204, 206, 208.

Necessary equipment for forging process. Photographs. 5 ref.

**6985* Heat Transfer in a Continuous Reheating Furnace.** R. J. Sarjant and D. Smith. *Institute of Fuel, Journal,* v. 27, Jan. 1954, p. 16-24.

Systematic experimental investigation into thermal factors of furnace design. Tables, graphs. 17 ref.

**6986 How Does Titanium Machine? I.** O. W. Boston. *Iron Age,* v. 173, Jan. 21, 1954, p. 100-103.

Research on chip formation, work hardening, surface finish, tolerances, cutting temperatures, and nature of tool wear. Photograph, micrographs, graphs, table.

**6987 How Does Titanium Machine? II.** O. W. Boston. *Iron Age,* v. 173, Jan. 28, 1954, p. 120-122.

Machining temperature, cutting speed, and tool shape. Diagrams, tables, graphs.

**6988 How Does Titanium Machine? III.** O. W. Boston. *Iron Age,* v. 173, Feb. 4, 1954, p. 146-149.

Data on drilling and reaming. Graphs, table, photograph.

**6989 Mechanized Sheet and Tinplate Mills.** John H. Mort. *Iron & Steel,* v. 27, Jan. 1954, p. 3-7.

Equipment, plant layout, and electrical energy consumption. Photographs, table. (To be continued.)

**6990 Application and Use of Self-Centering Rolls.** E. T. Lorig. *Iron and Steel Engineer,* v. 31, Jan. 1954, p. 59-72; disc., p. 73.

Ingenious refinements developed in application of self-centering rolls to handling strip. Diagrams.

**6991 Roll Pass Design for Beams.** D. A. Winton. *Iron and Steel Institute, Journal,* v. 176, Jan. 1954, p. 3-17.

Basic principles and influence of mill design on roll design, roll clearance, and position of the passes. Curves suggested for calculating numbers and sizes of passes for rolling any size of beam. Diagrams, tables, graphs.

**6992* A Tool-Blade Wear Test for Cutting Fluids.** L. C. Hays and E. J. R. Hudec. *Lubrication Engineering,* v. 10, Feb. 1954, p. 20-23.

Method of evaluating cutting fluids on a lathe involves measuring wear of blunt tool blade which is rubbed against freshly cut surface under applied load. Tables, diagram, graphs. 3 ref.

**6993* Machining the Aviation Gas Turbine High Temperature Alloys.** D. C. Goldberg and H. O. J. Hanzlick. *Machine and Tool Blue Book,* v. 49, Jan. 1954, p. 206-211, 214-218, 220-223.

Metallurgical requirements for compressor, combustion chamber, turbine, and afterburner as well as tooling required to fabricate parts. Tables, photograph.

**6994* Magnetic Tape Programming of Machine Tools.** Lawrence R. Peaslee. *Machinery,* v. 60, Jan. 1954, p. 166-172.

Tape passing through recorder sets up, or "programs", signals necessary to control all moving members of a machine tool throughout its operating cycle. Photographs, diagrams.

**6995* Lockheed Mechanizes Extrusion Bending.** Fred C. Hoffman. *Machinery,* v. 60, Feb. 1954, p. 196-199.

Equipment and techniques employed. Photographs.

**6996 Developments in Aircraft Production Methods.** S. P. Woodley. *Machinery (London),* v. 84, Jan. 8, 1954, p. 88-94.

Replacement of sheet-metal assemblies by single components machined "from the solid," has modified production trends. Photographs, drawings.

**6997 Production of Large Aircraft Panels From Sheet Material.** R. B. Scott and R. L. Vaughan. *Machinery (London),* v. 84, Jan. 15, 1954, p. 121-125.

Fabrication of many airframe parts, simplified by use of an 8,000-ton Birdsboro hydraulic triple-action press, installed by the Lockheed Aircraft Corp., Burbank, Calif. Photographs, diagram.

**6998 Bending Thin-Wall Tubing.** F. Pesak. *Machinery (London),* v. 84, Jan. 15, 1954, p. 129-133.

Need for saving weight and space in current and prototype aircraft designs often introduces problems which cannot be solved by established fabricating techniques. Relates to bending of thin-wall tubing for high-pressure ducts of heating and ventilating systems. Diagrams, photographs.

**6999 Induction Heating in Modern Forging Plants.** A. R. Baffrey. *Metal Treatment and Drop Forging,* v. 21, Jan. 1954, p. 35-39.

Information on some Belgian induction-heating units for this purpose. Graphs, photographs, diagram.

**7000* Press Forgings—Their Use and Growth.** Ernest C. Morse. *Modern Industrial Press,* v. 16, Jan. 1954, p. 42, 44, 46, 48, 50, 52, 54.

Includes photographs, graph.

**7001* The Sheffield Experimental Cold Rolling Mill.** (English.) H. Ford. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 11, Nov. 1953, p. 323-329.

Equipment and instruments for measuring roll force and torque; strip tension and thickness. Diagrams, photographs. 36 ref.

**7002* Increased Productivity With Carbides. I. Selection and Application.** Guy Monacelli. *Screw Machine Engineering,* v. 15, Jan. 1954, p. 33-37.

Factors considered in machining metals and non-metals. Photographs, tables, diagrams.

**7003* Increased Productivity With Carbides. II. Proper Brazing Techniques.** Guy Monacelli. *Screw Machine Engineering,* v. 15, Feb. 1954, p. 51-52, 54.

Brazing of carbide tips to steel shanks. Photographs.

## *Metals—Mechanical Working*

**7004* The Forming of Aluminium Sheet. III. Spinning.** H. Hinxman. *Sheet Metal Industries*, v. 31, no. 321, Jan. 1954, p. 41-45, 40.

Properties and technique. Photographs. (To be continued.)

**7005 Cold Reciprocating Rolling of Pipes. Experimental Results of Investigation of the Rolling Process.** (German.) Friedrich Wilhelm Neumann and Erich Siebel. *Stahl und Eisen*, v. 74, no. 3, Jan. 28, 1954, p. 133-145.

Process, effect of various factors, and calculation of rolling pressure. Graphs, photographs, diagrams, tables. 6 ref.

**7006* Stripper Pressure in Deep Drawing.** Erich Siebel. *Stahl und Eisen*, v. 74, no. 3, Jan. 28, 1954, p. 155-158.

Formation of wrinkles, deformation, and buckling process. Diagrams, graphs, tables.

**7007 Research Views Machinability. How to Determine Machinability.** Francis W. Boulger. *Steel*, v. 134, Jan. 18, 1954, p. 88-90.

Inherent ability of workpiece material to aid cutting tool is part of rapid-machining picture. Effect of environmental factors. Graphs, tables, photograph, diagram.

**7008 Self Contained Pump Units as Applied to Extrusion Presses.** A. J. de Matteo. *Steel Processing*, v. 40, Jan. 1954, p. 15-20.

Equipment, plant layout, and operating procedures. Photographs, diagrams.

**7009 Manufacture and Properties of Large Forgings.** Adolph O. Schaefer. *Steel Processing*, v. 40, Jan. 1954, p. 24-32.

Includes photographs, tables, diagrams.

**7010* Magnesium Forming. IV. Deep Drawing and Miscellaneous Methods.** Francis L. Coenen. *Tool Engineer*, v. 32, Feb. 1954, p. 68-71.

Effects of temperature, rate of loading, and lubrication. Diagram, graph, photographs.

**7011* Steel Cartridge Cases. Their Cold Forming and Heat Treating.** S. S. Rice. *Tooling and Production*, v. 19, Dec. 1953, p. 52-58.

Includes photographs, diagrams, micrographs.

**7012* Stretch Forming. A Specialty.** *Western Machinery and Steel World*, v. 45, Jan. 1954, p. 99-101.

Discusses underlying principles. Photographs.

**7013* Physical and Technological Principles of Oxygen Cutting.** (French-German.) C. G. Keel. *Zeitschrift für Schweisstechnik*, v. 44, no. 1, Jan. 1954, p. 1-5.

Cutting of various metals and properties of oxides formed. Diagrams, graphs, table. (To be continued.)

*Books and Miscellaneous Publications*

**7014 The Influence of Machining and Grinding Methods on the Mechanical and Physical Condition of Metal Surfaces.** Peter Spear, Ian R. Robinson, and K. J. B. Wolfe. Paper from PROPERTIES OF METALLIC SURFACES, SYMPOSIUM. INSTITUTE OF METALS, MONOGRAPH AND REPORT SERIES 13. p. 59-100. 1953. Institute of Metals, London. (TS213 P94)

Problems associated with physics and chemistry of metal surfaces. Spectrographs, tables, micrographs, graphs, photographs. 12 ref.

***See also:***
**6371** (regulated drive for rod-drawing mill)
**6653** (lubricants for metal working)
**6655** (lubricants for grinding)
**6681** (mass production of precision work)
**6693** (designing for flame cutting requirements)
**6706** (manufacture of tools)
**6956** (chemosorption during cold working)

## METALS—METALLOGRAPHY, TRANSFORMATIONS, AND STRUCTURES

**7015 On the Nuclear Magnetic Resonance in Metals and Alloys.** (English.) N. Bloembergen and T. J. Rowland. *Acta Metallurgica*, v. 1, no. 6, Nov. 1953, p. 731-746.

Effects explained in terms of quadrupole interaction and information of state of order or disorder on an atomic scale in the alloy. Graphs, tables, oscillograms. 36 ref.

**7016 The Structure of Gamma-Manganese.** (English.) Z. S. Basinski and J. W. Christian. *Acta Metallurgica*, v. 1, no. 6, Nov. 1953, p. 754-755.

Disputes that γ-Mn has face-centered-tetragonal structure at all temperatures. 4 ref.

**7017* Special Growth Structures of Metal Crystals Solidified From the Melt.** (German.) Friedrich Blaha. *Acta Physica Austriaca*, v. 8, no. 2, Dec. 1953, p. 141-166.

Crystallization tests with Zn, Cd, and Sn reveal that slight changes in experimental conditions will affect crystal structure. Diagrams, photomicrographs. 44 ref.

**7018* The Analysis of Structural Components in Pig and Cast Iron.** (German.) Walter Koch and Joachim Bruck. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 11-12, Nov.-Dec. 1953, p. 457-464; disc., p. 464.

Microscopic, X-ray, and electrochemical studies were made. Technique is described. Tables, graphs, micrographs. 23 ref.

**7019* Anisotropic Changes in Size Due to Heat-Treatment of Ledeburite Chrome-Tool Steels.** (German.) Josef Frehser. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 11-12, Nov.-Dec. 1953, p. 483-494; disc., p. 494-495.

Results show causes of anisotropic size change from hardening and tempering can be expressed in general principles. Tables, graphs, diagrams, micrographs. 38 ref.

**7020* Mechanism of Austenite-Martensite Transformation.** (German.) Helmut Knapp. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 11-12, Nov.-Dec. 1953, p. 497-504.

Recent literature on crystallography. Shows displacement of atoms can be represented by a single matrix. Diagrams. 25 ref.

**7021* Application of Time-Temperature Transformation Diagram of Continuous Cooling to Heat Treating Problems.** (German.) Adolf Rose and Werner Strassburg. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 11-12, Nov.-Dec. 1953, p. 505-514.

Applicability of time-temperature-transformation diagrams as a means of determining cooling process in interior of large blocks of steel and its hardenability. Graphs, table, diagram, micrographs. 33 ref.

**7022* Metallographic Investigations of Nonmetallic Inclusions in Steel by a Novel Thin-Specimen Process.** (German.) Erich Folkhard. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 11-12, Nov.-Dec. 1953, p. 519-522.

Specimens were ground fine and the metal matrix dissolved and examined under the microscope. Micrographs. 3 ref.

**7023 The Use of Carbon Crucibles in Measurements on the Rate of Evaporation of Liquid Metals in a Vacuum.** M. G. Rossmann and J. Yarwood. *British Journal of Applied Physics*, v. 5, Jan. 1954, p. 7-13.

Conditions necessary to obtain measurements on evaporation of metals which liquefy at elevated temperatures in a vacuum. Tables, diagram. 8 ref.

**7024 On the Solid Solutions of Metallic Compounds.** I. I. Kornilov. *Henry Brutcher, Altadena, Cal., Translation no.* 2842, 9 p. (From *Doklady Akademii Nauk SSSR*, v. 81, no. 4, 1951, p. 597-600.)

Previously abstracted from original. See item 3926, v. 2, May 1953.

**7025 Transformation of Austenite Into Martensite at Subzero Temperature. II.** V. G. Vorob'ev and A. P. Gulyaev. *Henry Brutcher, Altadena, Cal., Translation no* 3021,

8 p. (From *Zhurnal Tekhnicheskoi Fiziki*, v. 21, no. 10, 1951, p. 1164-1169.)

Best cooling rate to sub-zero temperatures, holding of steel at such temperatures, and effect of cold treating on quantity of retained austenite and on increase in steel hardness. Graphs. Graphs.

**7026 Nitriding of Iron.** I. R. Krichevskii and N. E. Khazanova. *Henry Brutcher, Altadena, Cal., Translation no.* 3028, 7 p. (From *Doklady Akademii Nauk SSSR*, v. 71, no. 3, 1950, p. 481-484.)

Investigation into rate of formation of γ-phase during nitriding of Fe at various temperatures in an ammonia-hydrogen mixture under atmospheric pressure. Graphs. 12 ref.

**7027 On the Migration of Austenite Grain Boundaries.** M. G. Lozinskii. *Henry Brutcher, Altadena, Cal., Translation no.* 3044, 8 p. (From *Doklady Akademii Nauk SSSR*, v. 82, no. 1, 1952, p. 53-56.)

Apparatus and procedure for study of migration of austenite-grain boundaries in steel as depending on temperature and duration of heating in vacuo. Diagrams, micrographs. 9 ref.

**7028 Contribution to the Problem of the Austenite-Martensite Transformation.** G. A. Oding. *Henry Brutcher, Altadena, Cal., Translation no.* 3046, 6 p. (From *Vestnik Mashinostroeniya*, v. 32, no. 3, 1952, p. 69-71.)

Study of martensite transformation over entire temperature range of this transformation at a cooling rate not in excess of 5 F per minute based on dilatometric method. Table, graphs. 3 ref.

**7029 Structure of Iron-Nickel-Aluminum Alloys for Permanent Magnets.** Yu. Skakov. *Henry Brutcher, Altadena, Cal., Translation no.* 3052, 9 p. (From *Doklady Akademii Nauk SSSR*, v. 79, no. 1, 1951, p. 77-80.)

Optical and electron microscopy, measurement of physical properties, and phase analysis. Micrographs. 5 ref.

**7030 Crystallization of Liquid Phase.** I. N. Bogachev. *Henry Brutcher, Altadena, Cal., Translation no.* 3081, 21 p. (Part Translation from Book by I. N. Bogachev and A. A. Popov, entitled "*Phase Transformations in Iron-Carbon Alloys*", Mashgiz, 1950, p. 4-17.)

Generalized outline of kinetics of crystallization of metals and alloys. Graphs, diagrams.

**7031* Direct Examination of Metals by the Electron Microscope.** (French.) Raymond Castaing and Paul Laborie. *Comptes rendus*, v. 237, no. 21, Nov. 23, 1953, p. 1330-1332.

Metal specimens thinned by ionic bombardment were examined. Discusses advantages of this method. Micrographs.

**7032* X-Ray Investigation of the Development of a Polygonized State From a Slightly Deformed Copper-Zinc Solid Solution.** (French.) Adrienne R. Weill. *Comptes rendus*, v. 237, no. 23, Dec. 9, 1953, p. 1527-1529.

Study of X-ray diffraction diagrams of 35% Zn alloy confirm polygonization mechanism. Micrographs.

**7033* Structure of Graphite Spherulites.** M. N. Parthasarathi and B. R. Nijhawan. *Foundry Trade Journal*, v. 95, Dec. 31, 1953, p. 809-815.

Discusses subject in light of experimental data, based on study of group of four nodules across its different parallel sections. Micrograph, table, photographs, diagrams. 7 ref.

**7034* The Mechanism of Graphite Crystallization in Iron.** (German.) E. Feil. *Giesserei*, v. 40, no. 24, Nov. 26, 1953, p. 629-634.

Data on formation of graphite in hypo- and hyper-eutectic iron, flaky and spheriod graphite, crystallization stages during solidification, symmetry of spheroid graphite, and chemical investigation of kish. Tables, micrographs, graph. 13 ref.

**7035* Analyzing Nonmetallic Inclusions in Steel by Electrolysis and Chlorination Electrolytical Analysis of Steel Carbides.** (Czech.) Miroslav Sícha. *Hutnické Listy*, v. 9, no. 1, Jan. 1954, p. 2-11 + 2 plates.

Inclusions were separated from carbides by chlorinating them in a vacuum-vessel. Sulfides were disengaged by electrolytical remainders and detected by special device. Diagrams, photographs, micrographs, table. 13 ref.

**7036 The Constitution of Alloys of Aluminium, Copper, and Iron.** H. W. L. Phillips. *Institute of Metals, Journal*, v. 82, Jan. 1954, p. 197-212 + 2 plates.

Constitution of Al-rich alloys investigated over range 0-40% Cu, 0-3.5% Fe by thermal analysis and microscopic examination, supplemented by measurements of liquid solubility. Graphs, tables. 21 ref.

**7037 The Structure of Titanium-Silver Alloys in the Range 0-30 At.-% Silver.** H. W. Worner. *Institute of Metals, Journal*, v. 82, Jan. 1954, p. 222-226 + 1 plate.

Metallographic and X-ray-diffraction methods to determine a partial phase diagram between 0 and 30 at.-% Ag, in a temperature range 650-1100 C. Graphs, tables. 7 ref.

**7038 The Metallographic Detection of Gamma Phase in Beta-Brass.** L. E. Samuels. *Institute of Metals, Journal*, v. 82, Jan. 1954, p. 227-228 + 1 plate.

Mechanical polishing to detect fine grain-boundary precipitates of γ phase in a Sn-containing β-brass showing intercrystalline brittleness. 11 ref.

**7039 Diffusion of Nitrogen in Iron.** J. D. Fast and M. B. Verrijp. *Iron and Steel Institute, Journal*, v. 176, Jan. 1954, p. 24-27.

Determination of the diffusion coefficient of N in γ-Fe at 950 C shows that diffusion in γ-Fe is much slower than in α-Fe. Graphs, tables. 10 ref.

**7040 A Thermodynamic Study of the Iron, Cobalt, and Nickel Sulphides.** Terkel Rosenqvist. *Iron and Steel Institute, Journal*, v. 176, Jan. 1954, p. 37-57; disc., p. 57-58.

Results with emphasis on their connection with structure of different phases and nature of interatomic binding forces. Graphs, tables, diagram. 40 ref.

**7041* Grain-Size Charts for Ferritic and Austenitic Structures.** (Swedish.) T. Berglund. *Jernkontorets Annaler*, v. 137, no. 11, 1953, p. 767-784.

Charts were established representing actual structures of ferrite, low carbon steel, and austenite. Relation between JKM and ASTM classifications for steels and Cu alloys. Tables, graphs, micrographs. 6 ref.

**7042* Diffusion of Carbon in Different Phases of Carbon Steel.** (Swedish.) M. Hillert and R. D. Sharp. *Jernkontorets Annaler*, v. 137, no. 11, 1953, p. 785-790.

Use of activity diffusion coefficients; computation of coefficients for carbon in ferrite and austenite; and experimental determination of coefficient for carbon in cementite. 10 ref.

**7043 Magnetic Transformation of Iron in Copper Matrix at Low Temperatures.** R. E. Cech and D. Tunrbull. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Jan. 1954, p. 45-46.

Phenomena initiated by subcooling below room temperature. Table. 5 ref.

**7044 Solidification of Aluminum-Rich Aluminum-Copper Alloys.** Arthur B. Michael and Michael B. Bever. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Jan. 1954, p. 47-56.

Investigates different solidification rates. Graphs, tables, micrographs. 21 ref.

**7045 Reaction of Oxygen and Nitrogen With Titanium From 700° to 1050° C.** Lee S. Richardson and Nicholas J. Grant. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Jan. 1954, p. 69-70.

Experimental studies in reaction rates. Graphs. 5 ref.

**7046 Structure of Some Iridium-Osmium Alloys.** H. C. Vacher, C. J. Bechtoldt, and E. Maxwell. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Jan. 1954, p. 80.

Techniques of crushing, polishing, and etching prior to X-ray diffraction and microscopic examination. Table, micrograph. 3 ref.

## *Metals—Metallography, Transformations, and Structures*

**7047 Constitution of Iron-Boron Alloys in the Low Boron Range.** M. E. Nicholson. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 185-190.

Results of studies in solubility of B in Fe. Graphs, micrographs, tables, diagram. 10 ref.

**7048 Crystallographic Angles for Hexagonal Metals.** A. Taylor and Sam Leber. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 190-192.

Interplanar angles to construct a stereographic projection. Tables, diagram. 4 ref.

**7049 Influence of Oxygen, Nitrogen, and Carbon on the Phase Relationships of the Ti-Al Systems.** R. J. Van Thyne and H. D. Kessler. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 193-199.

Micrographic analysis of annealed high purity arc melted alloys, the principal method of investigation, was supplemented by X-ray diffraction. Graphs, micrographs, tables, phase diagrams. 7 ref.

**7050 Titanium-Chromium-Oxygen System.** Chih-Chung Wang and Nicholas J. Grant. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 200-206.

Includes phase diagrams, diagrams, tables, micrographs, graphs. 17 ref.

**7051 Uranium-Titanium Alloy System.** Murray C. Udy and Francis W. Boulger. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 207-210.

Preparation of alloys; fabrication; heat treatment; metallographic and X-ray examination; and phases present. Micrographs, table, phase diagram. 2 ref.

**7052 Aging Characteristics of Nickel-Chromium Alloys Hardened With Titanium and Aluminum.** Rolf Nordheim and Nicholas J. Grant. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 211-218.

Extensive study of aging by means of hardness, hot electrical resistance, X-ray, and microscopy. Micrographs, tables, phase diagram, graphs. 10 ref.

**7053 A Cursory Investigation of Intermediate Phases in the Systems Ti-Zn, Ti-Hg, Zr-Zn, Zr-Cd, and Zr-Hg by X-Ray Powder Diffraction Methods.** Paul Pietrokowsky. *Journal of Metals*, v. 6; *American Institue of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 219-226.

Physical metallurgy of Ti and Zr when alloyed with elements in subgroup II-B of periodic table. Tables. 15 ref.

**7054 System Titanium-Manganese-Molybdenum.** R. P. Elliott. B. W. Levinger, and W. Rostoker. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers*, v. 200, Feb. 1954, p. 228-232.

Phase equilibria in Ti-Mn-Mo system were investigated in composition range 100 to 60% Ti and in temperature range 500 to 1150 C. Phase diagrams, table. 7 ref.

**7055 Constitution and Properties of Ag-Cu-Zn Brazing Alloys.** Karl M. Weigert. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 233-237.

Experimental studies on structure and mechanical properties. Micrographs, phase diagrams, graphs, table. 6 ref.

**7056 The Sigma Phase in Binary Alloys.** Peter Greenfield and Paul A. Beck. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 253-257.

Experimental data on conditions for sigma formation in a series of alloys. Tables. 28 ref.

**7057 An Investigation of the Systems Formed by Chromium, Molybdenum, and Nickel.** David S. Bloom and Nicholas J. Grant. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 261-268.

Investigation of Cr-Mo-Ni ternary system and attendant binaries. Graphs, phase diagrams, table, micrograph. 7 ref.

**7058 System Zirconium-Oxygen.** R. F. Domagala and D. J. McPherson. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 238-246.

Experimental studies. Tables, diagram, micrograph. 18 ref.

**7059 A Study of the Effect of Carbon Content on the Structure and Properties of Sintered WC-Co Alloys.** Joseph Gurland. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 285-290.

Grain growth of WC during sintering was measured. Reaction takes place mainly by solution and reprecipitation of the carbide in and from the binder at sintering temperature. Tables, graphs, micrographs, phase diagrams. 13 ref.

**7060 Orientation Relationships in Cast Germanium.** W. C. Ellis and Jacqueline Fageant. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 291-294.

All major regions in a progressively solidified Ge ingot were related through successive orders of octahedral twinning. Occurrence of lineage structure and generation and survival of orientations are discussed. Photographs. 10 ref.

**7061 Redistribution of Solutes by Formation and Solidification of a Molten Zone.** W. G. Pfann. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 294-297.

Formation and slow solidification of a molten zone in a homogeneous ingot produces a discontinuity in solute concentration at boundary of the zone and a gradient of concentration within the zone. Tests were made on Ge. Diagrams, graph, photographs. 9 ref.

**7062 On the Temperature Range of the Martensitic Transformation in the Cu-Zn System.** A. L. Titchener and M. B. Bever. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 303-304.

Experimental studies. Table, graphs. 6 ref.

**7063* An Application of the Absolute Rate Theory to Phase Changes in Solids.** F. Wm. Cagle, Jr. and Henry Eyring. *Journal of Physical Chemistry*, v. 57, Dec. 1953, p. 942-946.

Theoretical analysis. Results are applied to white to gray transition in Sn. Graphs.

**7064* The Gallium-Indium System.** W. J. Svirbely and Sidney M. Selis. *Journal of Physical Chemistry*, v. 58, Jan. 1954, p. 33-35.

Cold working permits repetition of age hardening. Resolution is probably due to local heating or supply of energy from cold-working operation. X-rays clearly reveal recovery-effect of cold-working. Graphs, X-ray recordings. 10 ref.

**7065* Recovery Phenomena in Copper-Beryllium Alloys Caused by Cold Working.** (German.) W. Gruhl and U. Gruhl. *Metall*, v. 8, nos. 1-2, Jan. 1954, p. 20-23.

Experiments reveal that cold working permits repetition of age hardening. Resolution is probably due to local heating or supply of energy from cold-working operation. X-rays clearly reveal recovery-effect of cold-working. Graphs, X-ray recordings. 10 ref.

**7066* The Hume-Rothery Phases in Alloys With More Than Two Components. I. Composition of Hume-Rothery Phases in Alloys With More Than Two Components. II. Phases With a 7:4 Ratio in the Ni-Cu-Sn System. III. Phases With Ratios of 3:2 and 21:13 in the Ni-Cu-Sn**

**System.** (Italian.) Francesco Mazzoleni. *Metallurgia italiana*, v. 45, no. 10, Oct. 1953, p. 363-373.

X-ray diffraction studies on alloys with various valence electron ratios. Diffraction spectra, diagrams. 21 ref.

**7067 Basic Diagrams of Composition vs. High-Temperature Strength.** *Metal Progress*, v. 65, Feb. 1954, p. 184-185. (Digest of "Basic Types of Diagrams of Composition Versus High-Temperature Strength in Mtallic Systems", I. I. Kornilov, *Doklady Akademii Nauk SSSR*, v. 86, 1952, p. 721-724.)

Effect of composition and structure on resistance of alloys to prolonged stressing at high temperatures. Graphs.

**7068* Interferometric Measurement of Grain Boundary Grooves.** (English.) S. Amelinckx, N. F. Binnendijk, and W. Dekeyser. *Physica*, v. 19, no. 12, Dec. 1953, p. 1173-1177.

Multiple beam interferometry for measurements of the dihedral angle of the groove between grains of polycrystalline metal aggregate. Micrographs, diagrams. 3 ref.

**7069* X-Ray Investigations of Low Carbon Steel Textures.** (Polish.) Z. Bojarski. *Prace Instytutow Ministerstwa Hutnictwa*, v. 5, no. 5, Sept.-Oct. 1953, p. 285-290.

Literature review on textures produced by rolling and recrystallization of Fe and low C steel. Tables, photograph, X-ray diffraction patterns. 22 ref.

**7070 A Thermal Gradient Method for the Study of Crystal Structure and Its Application to Order-Disorder Research.** John B. Newkirk. *Review of Scientific Instruments*, v. 24, Dec. 1953, p. 1116-1121.

Method for studying effect of temperature on crystal structure of metals and alloys. Micrographs, diagrams, photograph.

**7071* On the Introduction of Carbon$^{14}$ Into Pure Iron by Gaseous Cementation.** (French.) Philippe Albert. *Revue de métallurgie*, v. 50, no. 12, Dec. 1953, p. 829-831; disc., p. 831-832.

Method gives good results. Carburization was carried out by means of acetylene prepard from $BaC_2$ containing $C^{14}$. Diagrams, table.

**7072* The Isothermal Transformation of Austenite and the Distribution of Alloying Elements in Low-Alloy Steels.** (French.) Axel Hultgren, et al. *Revue de métallurgie*, v. 50, no. 12, Dec. 1953, p. 847-867.

Various types of transformation were distinguished and their kinetics determined. Tables, graphs, micrographs. 23 ref.

**7073 Electronic Eigenvalues of Copper.** D. J. Howarth. *Royal Society, Proceedings*, v. 220, ser. A, Dec. 22, 1953, p. 513-529.

Electronic wave functions and eigen values at points of high symmetry in Brillouin zones of metallic Cu. Tables, graphs, diagrams. 20 ref.

**7074 Effects of Band Shape on the Magnetic and Thermal Properties of Metals and Alloys.** E. W. Elcock, P. Rhodes, and A. Teviotdale. *Royal Society, Proceedings*, v. 221, ser. A, Jan. 7, 1954, p. 53-77.

Temperature variations of electronic contributions to paramagnetic susceptibility and specific heat of metals are calculated for various forms of electron energy bands. Results are applied to experimental data for Pd and Pd-Ag alloys. Graphs, diagrams. 19 ref.

**7075 Take Guesswork Out of Grain Size Determinations.** Richard F. Harvey. *Steel*, v. 134, Feb. 1, 1954, p. 108-109.

Technique makes high speed tool steel grain boundaries as clear as original hardened structure before tempering. Graph, micrographs. 2 ref.

**7076* Analytical Aspects of X-Ray Diffraction.** James I. Mueller. *Trend in Engineering, (University of Washington)*, v. 6, Jan. 1954, p. 5-9, 28.

Applications in fields of metallurgy; mining and prospecting; mineral preparation; and ceramics. Spectrographs, graphs, table, diagram.

**7077 Transformation of Cr-Mo Steels During Welding.** W. R. Apblett, Jr., R. P. Dunphy, and W. S. Pellini. *Welding Journal*, v. 33, Jan. 1954, p. 57S-64S.

Experimental procedures and results using two Cr-Mo steels. Table, diagrams, graphs, micrographs.

**7078* Crystal Growth and Plasticity.** (German.) W. Kossel. *Zeitschrift für Naturforschung*, v. 8a, no. 12, Dec. 1953, p. 815-823 + 4 plates.

Plastic deformation and crystal growth from a non-oriented phase are shown to be similar phenomena. Diagrams, micrographs. 9 ref.

*Books and Miscellaneous Publications*

**7079 Specialized Microscopical Technique in Metallurgy.** S. Tolansky. Paper from PROPERTIES OF METALLIC SURFACES. MONOGRAPH AND REPORT SERIES 13. p. 1-22; disc., p. 295-364. 1953. Institute of Metals, London. (TS213 P94)

General survey of microscope as used for metallurgical studies. Micrographs. 10 ref.

**7080 Radioisotopes in the Study of Metal Surface Reactions in Solutions.** Massoud T. Simnad. Paper from PROPERTIES OF METALLIC SURFACES, SYMPOSIUM. INSTITUTE OF METALS, MONOGRAPH AND REPORT SERIES 13. p. 23-58; disc., p. 295-364. 1953. Institute of Metals, London. (TS213 P94)

Exchange between metals and ions in solution is dealt with. Previous experiments and explanations are critized. Several generalizations are made regarding mechanism of this phenomenon. Micrographs, table, diagram. 195 ref.

**7081* 1953 Supplement to the Atlas of Isothermal Transformation Diagrams.** 529 p. 1953. United States Steel Corp., Pittsburgh. (TN731 Un3a2)

Present book, in conjunction with 1951 Edition of "United States Steel's Atlas of Isothermal Transformation Diagrams," makes conveniently available all the diagrams formerly available only through consultation of many sources.

***See also:***
**6117** (metallography of pure iron)
**6240** (crystal growth)
**6719** (structure of Cu alloys)
**6900** (martensite formations on wire rope)

## METALS—POWDER

**7082 Compacting and Sintering of Metal Powders Studied on Basis of Their Electrical Conductivity.** V. I. Likhtman and L. T. Nazarov. *Henry Brutcher, Altadena, Cal., Translation no.* 3065, 13 p. (From *Zhurnal Tekhnicheskoi Fiziki*, v. 22, no. 4, 1952, p. 696-702.)

Electrical conductivity of metal-powder compacts as consistent function of size, character, and number of areas of contact. Experimental set-up and procedure. Tables, graphs. 5 ref.

**7083 Crystal-Lattice Distortions and Sintering of Metal Powders.** L. I. Gal'perina, Ya. E. Geguzin, N. Ya. Pines, and I. V. Smushkov. *Henry Brutcher, Altadena, Cal., Translation no.* 3088, 7p. (From *Doklady Akademii Nauk SSSR*, v. 88, no. 2, 1953, p. 265-268.)

Processes of stress relief and elimination of crystal-lattice distortions in metal-powder compacts studied by X-ray diffraction and by heat capacity measurements. Table, graphs. 7 ref.

**7084* Precision Parts Sintered in Gas-Fired Furnace.** Robert O. Borden. *Industrial Gas*, v. 32, Jan. 1954, p. 3-5.

Meter operation is improved and maintenance minimized. Production is increased and cost of parts considerably reduced. Diagrams, photographs, table.

**7085* Atomization of Low Melting Metal Powders.** (Polish.) W. Rutkowski and W. Cegielski. *Prace Instytutow Ministerstwa Hutnictwa*, v. 5, no. 5, Sept.-Oct. 1953, p. 291-297.

Apparatus for atomization of molten Sn, Pb, and Zn; operating conditions of atomization; and various properties of the powders. Micrographs, tables, diagrams. 5 ref.

*Metals—Powder*

**7086* Piston Rings of Iron Powder.** Alfred Hermanns. *Precision Metal Molding*, v. 12, Feb. 1954, p. 35-37, 78-81.

Economical and metallurgical advantages of method. Microphotographs, graph.

**7087 Metal Powders Ease Production Headaches.** Allen G. Gray. *Steel*, v. 134, Jan. 25, 1954, p. 88-91.

Cost saving applications being made in idustry. Photographs.

***See also:***
**6912** (strength of Al powder)

## MINING ENGINEERING

**7088 Mining Highlights—1953.** *Coal Age*, v. 59, Feb. 1954, p. 82-86.

Development and application of new machines and ideas to reduce costs in deep and strip mining. Diagrams, tables.

**7089* Metal Mining in Sweden and Its Geological Panorama.** (Portuguese.) Olof H. Ödman. *Engenharia, mineracao e metallurgia*, v. 18, no. 107, July-Aug. 1953, p. 221-226.

Development of mining industry as a factor in Sweden's economic situation. Maps, tables.

**7090* An Evaporation Method for Measuring the Resistivity-Water Saturation Characteristics of Cores.** J. Birks. *Institute of Petroleum, Journal*, v. 40, Jan. 1954, p. 14-17.

A solution of calcium sulfate of constant specific resistance was developed. Results for typical sandstone and limestone samples. Graphs, table. 4 ref.

**7091 Saturation Determination of Rotary Cores.** H. T. Kennedy, O. E. Van Meter, and R. G. Jones. *Petroleum Engineer*, v. 26, Jan. 1954, p. B52, B54, B56, B59-B60, B62, B64.

Mechanism of mud flushing and pressure depletion on several types of rotary cores and investigation to determine extent to which final fluid saturations measured on cores in laboratory may be taken as indication of their contents in place in reservoir. Diagrams, graphs, tables. 5 ref.

**7092 Hydraulic Horsepower Aids Lower Drilling Costs in South Louisiana.** W. S. Sease. *Petroleum Engineer*, v. 26, Jan. 1954, p. B77-B80.

Faster peneration with more hole per trip results from correct nozzle size selection and use of two-cutter bits. Graphs, photographs.

**7093 Oil Displacement by Detergents.** H. N. Dunning, R. T. Johansen, and Lun Hsiao. *Petroleum Engineer*, v. 26, Jan. 1954, p. B82-B90.

Investigation of surface active additives shows improved recovery efficiency of floods is possible. Tables, graphs. 23 ref.

**7094 A Simplified Cementing Technique for Recompletion Operations.** T. A. Huber, G. H. Tausch, and J. R. Dublin, III. *Journal of Petroleum Technology*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 201, Jan. 1954, p. 27-33.

Substantial cost reductions by use of simplified or low-pressure cementing technique. Ratio of successful squeeze-cement operations was increased. Diagrams. 3 ref.

**7095 Effectiveness of Gun Perforating.** T. O. Allen and J. H. Atterbury, Jr. *Journal of Petroleum Technology*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 201, Jan. 1954, p. 34-40.

Analog and laboratory penetration investigations of effectiveness of gun perforating, and perforation plugging experiments now in progress. Table, photographs, diagrams. 7 ref.

**7096 Some Practical Aspects of Gravel Packing.** C. J. Rodgers. *Journal of Petroleum Technology*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 201, Jan. 1954, p. 41-47.

Advantages of technique. Tables, diagrams. 6 ref.

**7097 Split Stream Testing of Two-Phase Gas Streams.** Don Attaway. *Petroleum Engineer*, v. 26, Jan. 1954, p. B66, B69-B70, B72, B74, B76.

Method for sampling gas well effluent to determine liquid hydrocarbon content. Diagrams, photographs. 3 ref.

**7098 Drainage and Utilization of Firedamp.** J. Venter and P. Stassen. *U. S. Bureau of Mines, Information Circular* 7670, Nov. 1953, 22 p. + 12 plates. (TN21 Un3i)

Paper prepared in response to an invitation by Bureau of Mines to acquaint American coal-mining industry with considerable progress that has been made in Belgium and other European countries on this subject. Tables, diagrams, graphs. 85 ref.

**7099 Morefield Pegmatite Mine, Amelia County, Va.** R. W. Geehan. *U. S. Bureau of Mines, Report of Investigations* 5001, Nov. 1953, 41 p. + plates. (TN21 UN3r)

In the area opened by mine workings, data were obtained on selective mining by using core drills for drilling blast holes. Standard drilling and blasting were done to obtain a comparison of relative time required by two methods. Tests indicated use of core drill makes selective mining of pegmatite raw-mineral zone feasible. Tables, graphs, maps, diagrams.

**7100 Anthracite Mechanical-Mining Investigations Progress Report 5: Recovery of Anthracite in a Steeply Pitching Bed by Induced Caving.** Andrew Allan, Jr. and R. S. Davies. *U. S. Bureau of Mines, Report of Investigations* 5013, Nov. 1953, 12 p. + 19 plates. (TN21 UN3r)

Experiments in a 14-foot bed consisting of a 6-foot bench of fairly hard coal at the bottom and an 8-foot bench of soft coal on top. Bed was inclined at 70° and extended 328 feet to the surface. The first 100 feet above rock gangway was solid coal; remainder mined many years before by conventional breast-and-pillar methods, so that roughly 50% of the coal remained in the form of pillars. Tables, photographs, diagrams.

**7101 Displacement of Petroleum From Sand by Detergent Solutions.** H. N. Dunning, Lun Hsiao, and R. T. Johansen. *U. S. Bureau of Mines, Report of Investigations* 5020, Dec. 1953, 19 p. + 5 plates. (TN21 Un3r)

Treatment with 56 detergents of various compositions. 23 ref.

**7102* How to Plan an Exploration Campaign. II.** E. B. Noble. *World Oil*, v. 138, Feb. 1, 1954, p. 90, 92, 104.

Emphasizes importance of accurate cost estimation and careful personnel selection. Table.

*Books and Miscellaneous Publications*

**7103 Mineral Dressing in Diamond Mining.** C. Stent and R. S. Young. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 647-652; disc., p. 653-655. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Developments in mineral dressing already in operation in diamond mines, with new advances which have passed laboratory and pilot plant stages and will shortly be installed on a full production scale. 4 ref.

**7104 The Preparation and Grading of Chrysotile Asbestos in Canada.** G. F. Jenkins. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 703-715; disc., p. 716-717. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Briefly traces development of milling practices of earlier years. Notes changes that have occurred. Table.

***See also:***
**6356** (all-electric rig drilling)

## NONDESTRUCTIVE TESTING

**7105* Measuring Wall Thickness of Steel Flasks in Production.** (German.) Franz Bollenrath and Viktor Hauk. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 11-12, Nov.-Dec. 1953, p. 515-518.

Continuous method of measuring thickness with X-rays. Counting tube is described. Photographs, diagrams, graphs. 14 ref.

**7106* Control Circuits of the Industrial X-Ray Apparatus Type TF 1555-A.** J. Jeremy Bliss. *Atomics (British)*, v. 5, Jan. 1954, p. 5-11.

Aided by functional diagrams, reader may obtain a general insight into methods employed in regulating radiographic exposures and in providing protection for both operator and equipment. Diagrams.

**7107 An Ultrasonic Apparatus for Non-Destructive Testing of Materials.** J. Krautkrämer, H. Krautkrämer, and O. Rüdiger, *Henry Brutcher, Altadena, Cal., Translation no.* 2879, 10 p. + 11 plates. (From *Archiv für das Eisenhüttenwesen*, v. 20, nos. 11-12, 1949, p. 355-358.)

Development of ultrasonic testing. Diagrams, graphs, micrographs. 9 ref.

**7108 Measurement of Thicknesses Below One Millimeter (0.04") With Beta Rays.** A. Trost. *Henry Brutcher, Altadena, Cal., Translation no.* 3057, 8 p. + 1 plate. (From *Stahl und Eisen*, v. 72 no. 16, 1952, p. 941-943.)

Types of radiation used for various metal thicknesses in order to obtain maximum accuracy of results. Graphs, diagrams, photograph.

**7109 Measuring the Thickness of Non-Magnetic Layer on Non-Magnetic Basis Materials With Beta Rays and Counting Tube.** R. Berthold. *Henry Brutcher, Altadena, Cal., Translation no.* 3060, 8 p. + 1 plate. (From *Stahl und Eisen*, v. 72, no. 16, 1952, p. 945-947.)

Use of Geiger counter for measuring X-rays excited by $\beta$ rays in determining thickness of non-ferromagnetic deposits on non-ferromangetic substrates such as Cr, Zn, or Pb on Al, Ag or Au on brass, etc. Graphs, diagram.

**7110 Nondestructive Ultrasonic Testing by the Pulse-Echo Technique.** A. Lutsch. *Henry Brutcher, Altadena, Cal., Translation no.* 3070, 18 p. + 1 plate. (From *Archiv für das Eisenhüttenwesen*, v. 23, nos. 1-2, 1952, p. 57-65.)

Longitudinal and shear waves are employed for non-destructive testing by the pulse-echo technique. Diagrams, graphs, micrographs, photographs. 19 ref.

**7111* Ultrasonics in Industry. II. Applications.** M. H. M. Arnold. *Chemical & Process Engineering*, v. 35, Jan. 1954, p. 15-19.

Critical assessment discussing instrumental, operative, chemical, and biological aspects of ultrasonics. Photographs. 46 ref.

**7112* The Non-Destructive Testing of Wire by Means of Ultrasonics.** Reimer Pohlman. *Draht (English Ed.)*, 1953, no. 17, Dec., p. 24-26.

Apparatus, techniques, and applications of test method. Graph, diagrams, photographs. 1 ref.

**7113 Radiographic Characteristics of High-Energy X-Rays.** A. L. Pace. *Foundry*, v. 82, Feb. 1954, p. 109-111, 178.

Application of high-voltage radiography results in considerable savings in salvage and repair of heavy cast parts. Photograph, radiographs, graphs.

**7114* Theory and Practice of Materials Testing With Ultrasound.** (German.) H. J. Seemann and W. Bentz. *Metall*, v. 8, nos. 1-2, Jan. 1954, p. 1-11.

Effect of structure on extinction of elastic waves and equipment, methods, and practical uses. Diagrams, oscillograms, photograph. 25 ref.

**7115 Simplified Autoradiography Exposure Calculation.** William W. Wainwright, Ernest C. Anderson, Preston C. Hammer, and Charles A. Lehman. *Nucleonics*, v. 12, Jan. 1954, p. 19-21.

Detail is improved by use of weak $\beta$ emitters. In isotope selection, charts are used to compare half-lives, emission energies, and to calculate exposure time. Photograph, autoradiographs, graph. 7 ref.

**7116 The Best Performance From Beta Gages.** L. R. Zumwalt. *Nucleonics*, v. 12, Jan. 1954, p. 55-58.

Thickness measurements by transmission or reflection. 6 ref.

**7117 Extinction in X-Ray Diffraction Patterns of Powders.** A. R. Lang. *Physical Society, Proceedings*, v. 66, no. 408B, Dec. 1953, p. 1003-1008.

Formula are proposed giving a first-order correction for reduction of reflecting power of small spherical crystals due to primary and secondary extinction. Graphs. 7 ref.

**7118* Application of Supersonics for the Inspection of Welds.** G. A. Homes and J. van Leemput. (French.) *Revue de la Soudure (Brussels)*, v. 9, no. 4, 1953, p. 214-225.

Methods and apparatus and use of supersonics to detect suspected areas for subsequent X-ray photography. Photographs, graphs, diagram.

**7119* Ultrasonic Testing of Round Steel Bars for Internal Defects.** (German.) Heinz Günther Brandt. *Stahl und Eisen*, v. 73, no. 26, Dec. 17, 1953, p. 1717-1720.

Tests on 30 to 90 mm. bars of high-speed tool steel by the impulse-echo process. Results satisfactory for bars over 40 mm. in size. Diagrams, graphs, table.

**7120* The Permeability of Steel to Ultrasound and Its Significance to Results of Impulse-Echo Testing Process.** (German.) Alfred Michalski. *Stahl und Eisen*, v. 74, no. 1, Jan. 1, 1954, p. 26-33.

Importance of distinguishing between real and pseudo obstructions and various causes of poor ultrasound transmission. Micrographs, photographs, diagram, graphs.

**7121 What's New in Nondestructive Testing.** S. A. Wenk. *Steel*, v. 134, Jan. 18, 1954, p. 78-81.

Wide variety of equipment is available to meet diverse needs of industry. Where possible, inspection and testing are being put right into production line. Photographs, diagram.

*Books and Miscellaneous Publications*

**7122 Analysis of the Area Determinations of Copper Powders.** B. D. Cuming and J. H. Schulman. Paper from RECENT DEVELOPMENTS IN MINERAL DRESSING, SYMPOSIUM. p. 5-9; disc., p. 85-97. Sept. 1952. Institute of Mining and Metallurgy, London. (TN500 R24)

Adsorption isotherms were carried out on heated and unheated Cu surfaces from gaseous, petroleum ether, and aqueous environment. Results are compared to geometrical and air-permeability 'areas'. Graphs, table. 5 ref.

***See also:***
**6401** (nondestructive testing of magnetic cores)
**6767** (batch identification with radioactive tracers)

## NUCLEAR PHYSICS, NUCLEONICS, AND RADIATION

**7123* Nuclear Power Production and Utilisation. I. Fission and Its Potentialities as a Power Source.** E. W. Titterton. *Atomics (British)*, v. 5, Jan. 1954, p. 23-27.

Examines various aspects of nuclear power production and issues involved in utilization of this tremendous new power resource. Treats the elementary physics of fission process; chain reaction; design of reactors; some typical reactors already in operation; future reactors; a short-term program for nuclear power; economics of the short-term program; and breeding process and its implications for the long-term nuclear power program. Diagrams. (To be continued.)

**7124* The Cooling of Nuclear Reactors.** B. L. Goodlet. *Atomic Scientists Journal*, v. 3, Jan. 1954, p. 133-141.

Factors considered in design. Graphs.

**7125* Automatic Recording of Chromatograms of Radioelements.** (French.) P. Bonet-Maury. *Bulletin de la société de France*, 1953, nos. 11-12, Nov.-Dec., p. 1066-1077.

Includes diagram, graphs. 4 ref.

**7126 Coincidence Studies of the Decay of Indium 114.** M. W. Johns, C. C. McMullen, R. J. Donnelly, and S. V. Nablo. *Canadian Journal of Physics*, v. 32, Jan. 1954, p. 35-48.

Concidence circuit of resolving time $3 \times 10^{-9}$ sec. was used to examine decay of $In^{114}$. Graphs. 31 ref.

## *Nuclean Physics, Nucleonics, and Radiation*

**7127 Photoneutron Cross Sections of Some Elements.** J. Goldemberg and Leon Katz. *Canadian Journal of Physics*, v. 32, Jan. 1954, p. 49-59.

Neutron yield from photo-reactions in nine elements measured as a function of maximum energy. Graphs, tables. 24 ref.

**7128* Distribution of Angular Intensity and the East-West Dissymetry of Nuclear Components of Cosmic Radiation in the Vicinity of the Equator, Studied by Using a Sensitive Emulsion.** (French.) Tsai-Chü and Max Morand. *Comptes rendus*, v. 237, no. 23, Dec. 9, 1953, p. 1517-1519.

Presents formulas representing zenithal distribution of angular intensity. Tables. 5 ref.

**7129 Generating R-F Power for 3-BEV Accelerator.** E. J. Rogers and M. Plotkin. *Electronics*, v. 27, Feb. 1954, p. 160-164.

R.F. generator that sweeps 11 to 1 frequency range during 1-sec. magnet pulse while maintaining a minium potential of 1,800 v. across ferrite-loaded gap. Graphs, diagrams, photograph. 4 ref.

**7130 Experts Appraise Nuclear Power.** S. A. Tucker. *Mechanical Engineering*, v. 76, Feb. 1954, p. 143-147.

A condensation of "Status of Nuclear Power Technology," John W. Landis; "The Problem From an Economic Standpoint", C. C. Whelchel; and "The Legal Situation", E. Blythe Stason presented before ASME Annual Meeting, N.Y.C., Nov.-Dec. 1953. Tables.

**7131 Radiation From Fast Electrons in a Magnetic Field.** A. A. Sokolov, N. P. Klepikov, and I. M. Ternov. *National Science Foundation Translation no.* NSF-tr-54, Aug. 1953, 5 p. (Original in *Doklady Akademii Nauk SSSR*, v. 89, 1953, p. 665-668.)

Computation of quantum corrections for total intensity of radiation. 5 ref.

**7132 Plans for the New Argonne Research Reactor, CP-5.** S. Untermyer. *Nucleonics*, v. 12, Jan. 1954, p. 13-15.

Design uses enriched-U fuel and heavy water as coolant-moderator. Tables, drawings, graph.

**7133 Kinetic Behavior of a Thermal Heavy-Water Reactor.** A. Lundby and N. Holt. *Nucleonics*, v. 12, Jan. 1954, p. 22-25.

Variations in neutron flux resulting when excess effective multiplication factor is suddenly made positive. Diagram, graphs, tables. 6 ref.

**7134 Gamma-Ray Scintillation Counter for Weak Radioactive Solutions.** C. P. Haigh. *Nucleonics*, v. 12, Jan. 12, Jan. 1954, p. 34-39.

Counter provides a practical limit of $10^{-11}$ curies per ml. with $I^{131}$ and $Fe^{59}$ solutions, bettering jacketed $\beta$ counter's $10^{-10}$ curies per ml. limit. Table, graphs, photograph. 6 ref.

**7135 Analysis of Radiation Fields of Two Gamma-Radiation Sources.** John G. Lewis, John V. Nehemias, David E. Harmer, and Joseph J. Martin. *Nucleonics*, v. 12, Jan. 1954, p. 40-44.

Analysis of two multi-kilocurie $Co^{60}$ $\gamma$ sources. Drawings, table, graphs. 6 ref.

**7136 Oil and the Atom.** W. L. Davidson. *Petroleum Engineer*, v. 26, Jan. 1954, p. E1, E4, E6, E8, E13, E15-E17, E20.

Compares potentialities. Predicts industries will complement rather than compete with each other. Photographs, diagrams, table.

**7137 Some Remarks on Theoretical Results of Extensive Air Shower Models.** (English.) M. Bruin. *Physica*, v. 19, no. 10, Oct. 1953, p. 909-914.

Data obtained from recent theoretical models of extensive air showers. Table. 12 ref.

**7138 The Quadrupole Moments of Nuclei According to the Spheroidal Nuclear Model. II.** (English.) R. Van Wageningen. *Physica*, v. 19, no. 10, Oct. 1953, p. 1004-1010.

Energy of a spheroidal nucleus is calculated as a function of eccentricity. 10 ref.

**7139 Numerical Calculations for the Angular Distribution of Gamma Radiation Emitted by Oriented $^{58}$Co Nuclei.** (English.) J. A. M. Cox, S. R. De Groot, and Chr. D. Hartogh. *Physica*, v. 19, no. 11, Nov. 1953, p. 1119-1122.

Angular distribution function of the $\gamma$-radiation has been calculated for an arbitrary degree of nuclear orientation and in dependence of a parameter. Table, diagram. 8 ref.

**7140 The Angular Distribution of Gamma Radiation From Oriented $^{60}$Co Nuclei and the Influence of the Character of the Preceding Beta-Transition.** (English.) J. A. M. Cox, S. R. De Groot, and Chr. D. Hartogh. *Physica*, v. 19, no. 11, Nov. 1953, p. 1123-1126.

Caluculations have been performed for the case that the spin of $Co^{60}$ has the normally accepted value 5, as well as for the case that the spin is 4. Diagram, tables. 5 ref.

**7141 Angular Distribution and Yield of the $^{13}C(d,p)^{14}C$ Reaction.** (English.) B. Koudijs, F. P. G. Valckx, and P. M. Endt. *Physica*, v. 19, no. 11, Nov. 1953, p. 1133-1139.

Protons were detected using nuclear emulsions. Target consisted of a thin layer of almost pure $C^{13}$ on a thin Al backing. Table, graphs. 10 ref.

**7142 The Second-Forbidden Beta Spectra of $Co^{60}$ and $Se^{46}$.** G. L. Keister and F. H. Schmidt. *Physical Review*, v. 93, ser. 2, Jan. 1, 1954, p. 140-145.

High-energy $\beta$-ray components found in decay of $Co^{60}$. Graphs, table. 26 ref.

**7143 Precision Determination of Photoneutron Thresholds.** Milton Birnbaum. *Physical Review*, v. 93, ser. 2, Jan. 1, 1954, p. 146-154.

Photoneutron thresholds for $C^{12}$, $N^{14}$, $O^{16}$, $Cu^{63}$, and $Ag^{109}$ determined by measurement of yield of activity as a function of the peak bremsstrahlung energy. Graphs, tables. 15 ref.

**7144 High-Energy Meson Production.** N. M. Duller and W. D. Walker. *Physical Review*, v. 93, ser. 2, Jan. 1, 1954, p. 215-226.

Study of angular distribution and interactions of secondary particles produced in penetrating showers. Diagrams, graphs, tables, photographs. 35 ref.

**7145 Cross Sections for Formation of $Na^{22}$ From Aluminum and Magnesium Bombarded With Protons.** R. E. Batzel and G. H. Coleman. *Physical Review*, v. 93, ser. 2, Jan. 15, 1954, p. 280-282.

Cross sections for formation of $Na^{22}$ from proton bombardment of Al and Mg have been determined for energy range from thresholds to 32 m.e.v. Graphs, table. 8 ref.

**7146 Angular Distribution of Protons From the Reaction $Na^{23}$ $(d,p)Na^{24}$.** Philip Shapiro. *Physical Review*, v. 93, ser. 2, Jan. 15, 1954, p. 290-294.

Angular distribtuion of several proton groups from the Na-23 $(d,p)$Na-24 reaction was studied using 3 m.e.v. deuterons. Results compared with Butler theory of angular distribution from $(d,p)$ reactions. Graphs, table, diagram. 15 ref.

**7147* Radiation Sickness in the Monkey.** Earl Eldred and William V. Trowbridge. *Radiology*, v. 62, Jan. 1954, p. 65-73.

Observations on clinical and pathological findings in animals subjected to total-body X-irradiation. Tables, graph. 25 ref.

**7148 Passage of Heavy Particles Through Matter.** S. K. Allison and S. D. Warshaw. *Reviews of Modern Physics*, v. 25, Oct. 1953, p. 779-817.

Stopping power and methods of measurement for low and high energy particles. Graphs, tables, diagrams. 109 ref.

**7149 Interpretation of the Virtual Level of the Deuteron.** S. T. Ma. *Reviews of Modern Physics*, v. 25, Oct. 1953, p. 853-860.

Mathematical discussion from the viewpoint of theory of scattering matrix and theory of derivative and $Q$ matrices. 34 ref.

*Books and Miscellaneous Publications*

**7150** (Principles of Atomic Physics. An Introduction to the Study of Wave Mechanics and Quantum Statistics.) **Grundlagen der Atomphysik, Eine Einführung in das Studium der Wollenmechanik und Quanterstatistik.** Hans Adolf Bauer. 4th Rev. Ed. 631 p. 1951. Springer-Verlag, Vienna. (QC173 B32g4)

Includes numerous illustrations, tables, charts, and equations. It is of value, not only as a textbook, but also a handbook for the engineer and physicist.

**7151 Luminescence and the Sicintillation Counter.** S. C. Curran. 219 p. 1953. Academic Press, New York. (QC475 C93L)

General idea of the sintillation counter; radiations and their interaction with matter; secondary emission; the electron multiplier; characteristics and performance data for commercial tubes; luminescence of solids; fluorescence of organic solids and liquids; preparation of scintillating crystals and liquids; properties of crystals and liquids; applications of scintillation counters and multiplier tubes; and circuits for scintillation counters are covered.

**7152 Pile Neutron Research.** D. J. Hughes. Addison-Wesley Nuclear Science and Engineering Series. 386 p. 1953. Addison-Wesley Publishing Co., Inc., Cambridge, Mass. (QC721 H87p)

Fundamental concepts of neutron physics; the pile as a neutron source; neutron standarization; fast neutron research; resonance neutrons in the pile; resonance neutron beams; thermal neutrons inside the pile; neutron diffusion measurements; thermal neutron beams; neutron diffraction; neutron refraction, reflection and polarization; and health physics.

**7153 Meson Physics.** Robert E. Marshak. 378 p. 1952. McGraw-Hill. (QC721 M35m)

Chapters covers single production of $\pi$ mesons in photon-nucleon and nucleon-nucleon collisions; nuclear production of single $\pi$ mesons; properties of $\pi$ mesons; capture and absorption of slow negative mesons; properties of $\mu$ meson; nuclear interacton of fast $\pi$ mesons; production of $\pi$ mesons at relativistic nucleon energies; and new particles and processes.

**7154 High Energy Nuclear Physics, Proceedings.** H. P. Noyes, M. Camac, and W. D. Walker, editors. v. III. 110 p. 1952. Dept. of Physics, Univ. of Rochester, New York. (QC173 H53)

Sections cover charge independence and saturation of nuclear forces; pion production and pion-nucleon scattering; $V^0$ particles; superheavy mesons; pion-nucleon phase shifts; megalomorphs; theoretical calculations; and experimental physics.

**7155 Nuclear Theory.** Robert G. Sachs. 383 p. 1953. Addison-Wesley Publishing Co., Inc., Cambridge, Mass. (QC173 Sa14n)

Covers nuclear force problem, the two body problem, and complex nuclei.

**7156 Conference on Nuclear Engineering, 1953, Proceedings.** Sections individually paged. Sept. 9-11, 1953. Univ. of Calif., Berkeley. (QC776 C76p)

These proceedings represent a program intended to help advance growth, stability, and value of the nuclear-energy field. They offer a high-level technical program of contributed, unclassified, and declassified papers for persons concerned with beneficial applications of atomic energy.

**7157 Wanted: A Single Purpose Nuclear Power Program.** George L. Weil. Paper from CONFERENCE ON NUCLEAR ENGINEERING, 1953 PROCEEDINGS. p. 1-9. Sept. 9-11, 1953. Univ. of Calif., Berkeley. (QC776 C76p)

Formulation of a realistic development program involves specification of our national objectives and performance goals; a schedule for achieving these goals; specific technical approaches; and a source of financial support.

**7158 The Economics of Power Reactor Processing.** D. E. Ferguson. **Relationship of Burnup, Specific Power, and Initial Enrichment to Nuclear Fuel Costs.** T. M. Snyder. Paper from CONFERENCE ON NUCLEAR ENGINEERING, 1953 PROCEEDINGS. p. C1-C17. Sept. 9-11, 1953. University of Calif., Berkeley. (QC776 C76p)

Economics of chemical processing for a breeder type reactor intended primarily for power production. Tables, diagram, graphs. 4 ref.

**7159 Enriching a Wide Variety of Stable Isotopes by the Electromagnetic Process.** C. P. Keim. Paper from CONFERENCE ON NUCLEAR ENGINEERING, 1953 PROCEEDINGS. p. I41-I51, Sept. 9-11, 1953. University of Calif., Berkeley. (QC776 C76p)

Calutron as a versatile isotope separator. Photographs, tables.

**7160 A Beta-Ray Microscope.** William Kerr and H. J. Gomberg. Paper from CONFERENCE ON NUCLEAR ENGINEERING, 1953 PROCEEDINGS, p. I79-I92. Sept. 9-11, 1953. University of Calif., Berkeley. (QC776 C76p)

Method for attaining medium precision (of the order 100 microns) in the location of radioactive isotopes in relatively static systems. Graphs, diagrams, table. 13 ref.

***See also:***

**5937** (effects of radiation on drug action)
**5964** (radioactive contaminants)
**6093** (analysis of labeled compounds)
**6096** (analysis of labeled samples)
**6127** (applied nuclear chemistry)
**6144** (action of X-rays on nucleic acids)
**6561** (azimuthal asymmetry of cosmic rays)
**6683** (servo control for reactors)
**6741** (design of reactor core components)
**6742** (metals for reactor cores)
**6767** (radioactive tracers in steel mills)
**6815** (radioactive isotopes in mineral dressing research)
**7106** (control circuits of industrial X-ray apparatus)
**7280** (crosslinking of rubber by pile radiation)
**7295** (atomic energy for heating)

## OPERATIONS RESEARCH AND MANAGEMENT ENGINEERING

**7161*** **The Relation of Fundamental Research to Engineering.** Vannevar Bush. *American Engineer,* 1953, May, p. 13-16.

General discussion with particular attention to program at Carnegie Institution. Photographs.

**7162*** **Toxicity of Silica. II. Characteristics of Protein Films Adsorbed by Quartz.** Lester D. Scheel, B. Smith, J. Van Riper, and E. Fleisher. *Archives of Industrial Hygiene and Occupational Medicine,* v. 9, Jan. 1954, p. 29-36.

Includes graphs, tables. 7 ref.

**7163*** **Comparative Toxicity of Two-Vinyl-Substituted Phosphates.** Jiro K. Kodama, Margarita S. Morse, Hamilton H. Anderson, Mary K. Dunlap, and Charles H. Hine. *Archives of Industrial Hygiene and Occupational Medicine,* v. 9, Jan. 1954, p. 45-61.

Study of mode of pharmacological action and signs exhibited, acute and sub-acute toxocity, and specific antidotal procedures indicate no singificant difference between two vinyl-substituted phosphates and parathion. Tables. 20 ref.

**7164*** **Modern Materials Handling in Industry. II.** *British Clayworker,* v. 62, Jan. 1954, p. 294-298.

Pre-selective and simple overhead chain conveyors; torsion and miscellaneous types of conveyors; and bulk and scraper conveyors. Diagrams. (To be continued.)

**7165*** **Safety in Materials Handling.** Alec Webster. *Chemical Age,* v. 70, Jan. 2, 1954, p. 27-30.

Points of danger to beware of in a factory.

**7166 Dollars and Science.** Merritt L. Kastens. *Chemical and Engineering News,* v. 32, Jan. 25, 1954, p. 302-304.

Industrial research to become competitive. Graph.

**7167 Handling Personnel Problems.** Trent H. Kemp. *Coal Age,* v. 59, Feb. 1954, p. 122-124.

Role of good supervisor.

## *Operations Research and Management Engineering*

**7168* Incentive Standards Without Time Studies.** L. E. Gaylord and C. R. Gillespie. *Flow*, v. 9, Feb. 1954, p. 78-81.

Two examples show how Alcoa has found work sampling technique a quicker and easier way to analyze jobs and provide added incentives to service forces. Tables, diagram.

**7169* Handling Safety Aids.** *Flow*, v. 9, Feb. 1954, p. 95-97.

Safety aids for materials handling. Photographs, drawings.

**7170* Quality Control in the Malleable-Iron Foundry.** (German.) V. Unger. *Giesserei*, v. 40, no. 25, Dec. 10, 1953, p. 668-672.

Melting procedure; furnace lining and repair; sampling; and testing. Diagrams, graphs, table. 6 ref.

**7171 Industrial Engineering Institute, Proceedings,** (Annual Volume), v. 4, 1952. 89 p. Univ. of California, Los Angeles. (T58 In2p)

Papers include "Time Study Training for Supervision and Union", J. F. Biggane; "Industrial Engineering in a Manufacturing Plant—A Case Study", Charles A. Bogenrief; "Engineering in the Fabrication Industries", L. M. K. Boelter; "Developing Standard Data for Predictive Purposes", Adam Abruzzi; "Presentation and Installation of Performance Standards and Incentive", T. L. Carroll; "Performance Rating of Work Measurement Film", John G. Carlson; "Presentation of the Society for Advancement of Management Time Study Rating Films", Bruce G. McCauley; "Statistical Description of Wage Incentive Systems", Jack Drandell; "Evaluation of a Multiple-Image Time Study Rating Film", E. S. Valfer; "Tests for Inspection Techniques", Alexander Rossi; "An Analysis of Fatigue in a Manual Operation", Dudley Josselyn; "A Study of the Effect of Mechanized Hospital Beds on the Time Requirement of Nurses", Joseph D. Carrabino; "A Motion and Time Method for the Evaluation of Prosthetic Devices", M. S. Gottlieb; "A Method for Kinematic Analysis of Motions of the Shoulder, Arm, and Hand Complex", Alfred C. Blaschke and Craig L. Taylor; "Work Measurement Survey of the Los Angeles Area", Ralph M. Barnes and W. E. Carroll; "Introduction of a Quality Control Program", Paul Peach; "Practice vs. Theory in Sampling Inspection", Henry P. Goode; "Luncheon Session Introduction", Neil H. Jacoby; "Overcoming Barriers to the Acceptance of New Ideas and Methods", Robert Tannenbaum; "The Tremendous Potential of Industrial Engineering", George Lawrence Hall; "Dynamic Incentives", Alexander Heron; and "The Role of Psychology in Industrial Engineering", R. Hollis Hamstra.

**7172* Modern Techniques of Financial Analysis for Management Planning. An AMA Symposium.** *Journal of Accountancy*, v. 97, Feb. 1954, p. 174-178.

Views on how to determine capital expenditures, what makes budgets work, and adequate executive compensation.

**7173* Sponsored Research in a Large University.** Richard Parmenter. *Journal of Engineering Education*, v. 44, Dec. 1953, p. 248-252.

General discussion with particular emphasis on Cornell's program.

**7174* A Short Forced-Choice Evaluation Form for Salesmen.** Erwin K. Taylor, Dorothy E. Schneider, and Nancy A. Symons. *Personnel Psychology*, v. 6, no. 4, Winter 1953, p. 393-401.

Form consisted of 32 forced-choice tetrads and 13 graphic rating scales. Forced-choice tetrads were item analyzed against bonus earnings, yielding a meaningless key and zero validity. Table. 4 ref.

**7175* A Training Evaluation Study.** Brent Baxter, Andrew A. Taaffe, and Joseph F. Hughes. *Personnel Psychology*, v. 6, no. 4, Winter 1953, p. 403-417.

Some personnel were provided conference training in centralized schools while others followed same text and assignments under local supervision. Groups compared with regard to their production job satisfaction, termination rate, life insurance knowledge, and supervisors' ratings. Tables. 10 ref.

**7176* Distortions in Management Perception.** Victor I. Bumagin. *Personnel Psychology*, v. 6, no. 4, Winter 1953, p. 445-460.

Compares three attitude studies administered to 64 supervisors representing all departments and levels of supervision below top management. Tables.

**7177* The Validity of Ratings of Several Levels of Supervisors.** Dean K. Whitla and John E. Tirrell. *Personnel Psychology*, v. 6, no. 4, Winter 1953, p. 461-466.

Procedure used involved rating of 100 flight mechanics by three levels of supervisors and correlation of their ratings with the ratee's scores on a job knowledge test. Table. 3 ref.

**7178* Employee Attitudes and Absences.** Helen Metzner and Floyd Mann. *Personnel Psychology*, v. 6, no. 4, Winter 1953, p. 467-485.

Studies determine relationship between absence rates and employees' attitudes for white and blue collar peacetime workers. Tables. 5 ref.

**7179* The Validity of Direct and Indirect Questions in Measuring Job Satisfaction.** Joseph Weitz and Robert C. Nuckols. *Personnel Psychology*, v. 6, no. 4, Winter 1953, p. 487-494.

Effectiveness of direct and indirect questioning techniques in determining job satisfaction and relationship between job opinions and performance criteria. Tables. 3 ref.

**7180 Profit Sharing Is Sound Business.** Stanwood I. Williams. *Petroleum Engineer*, v. 26, Jan. 1954, p. A47-A48.

Letting employee share in profits under incentive management plan stabilized personnel problems and company income was improved.

**7181* Statistical Quality Control of Plating Operations.** J. Forster-Cooper. *Product Finishing*, v. 7, Jan. 1954, p. 48-56.

Ways in which statistical quality control of automatic, semi-automatic, and still vat plating operations is carried out in a large organization. Graphs, photographs.

**7182* Effect of 2,3-Dimercaptopropanol (BAL) Upon Distribution and Excretion of Plutonium.** Bergene Kawin and D. Harold Copp. *Society for Experimental Biology and Medicine, Proceedings*, v. 84, Dec. 1953, p. 576-577.

Includes table. 10 ref.

**7183* Therapy of Experimnetal Hydrazine Poisoning.** Versa V. Cole, David L. Hill, and Aili H. Oikemus. *Society for Experimental Biology and Medicine, Proceedings*, v. 84, Dec. 1953, p. 661-662.

Includes tables. 6 ref.

**7184 Operations Research From Top Management's Point of View.** Clay H. Hollister. *Stove Builder*, v. 19, Feb. 1954, p. 22-25, 78, 80, 82, 84-85.

Advantages to business which will assist in evaluating all complex problems before making decisions.

**7185* Practical Uses of Statistical Quality Control.** Martin H. Saltz. *Tool Engineer*, v. 32, Feb. 1954, p. 49-52.

System now in use successfully. Photograph, tables.

**7186* Sequential Work Sampling.** Berl W. Owens. *Trend in Engineering, (University of Washington)*, v. 6, Jan. 1954, p. 23-27.

Advantages of method. Graphs.

**7187 Review of Literature on Health Hazards of Metals. I. Copper.** Sara J. Davenport. *U. S. Bureau of Mines, Information Circular* 7666, Nov. 1953, 114 p. (TN21 Un3i)

Voluminous data available for publication by Bureau of Mines revised and brought up to date. 230 ref.

**7188 A New Method of Analyzing Extreme-Value Data.** Julius Lieblein. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3050, Jan. 1954, 88 p. (TL570 Un3t)

Method of application; techniques providing a simple means for estimating necessary parameters; making predictions from fitted curve; estimating reliability; and evaluating efficiency of the method. Graphs, tables. 21 ref.

*Books and Miscellaneous Publications*

**7189 Spending for Industrial Research 1951-1952.** DeWitt C. Dearborn, Rose W. Kneznek, and Robert N. Anthony. 103 p. 1953. Div. of Research, Graduate School of Business Administration, Harvard University, Boston. (T176 D34s)

Includes "Introduction and Summary of Findings"; "The 4,800-Company Survey"; "The 1,540-Company Survey"; and "The 191-Company Survey". Tables, graphs.

**7190 Psychosis and Civilization.** Herbert Goldhamer and Andrew W. Marshall. 126 p. 1953. Rand Corporation. (RA790 G56p2)

Mental hospital admission rates in Massachusetts and conditional expectancy in mental disease.

**7191 Research Operations in Industry.** David B. Hertz and Albert H. Rubenstein, editors. 453 p. 1953. King's Crown Press, Columbia Univ., New York. (T175 676r)

Papers delivered at 3rd annual conference on Industrial Research, June 1952, with selected papers from 1st and 2nd conferences. Sponsored by Dept. of Industrial Engineering, Columbia University.

**7192 Communication in Management.** Charles E. Redfield. 290 p. 1953. Univ. of Chicago Press, Chicago. (HF5500 R24c)

Communicaton; its role in administration; communication downward and outward; communication upward and inward; horizontal communication; and the future importance of communication in management.

*See also:*
**6272** (quality control in paint industry)
**6844** (foundry control)
**6845** (foundry management)
**7262** (chemical toxicological engineering conference)

## PHYSICS

**7193 The cgs Units of Magnetic Susceptibility and Specific Magnetization.** Ernst M. Cohn and Morris Mentser. *American Journal of Physics*, v. 21, Dec. 1953, p. 681-682.

Units, defining equations, inconsistencies. Table. 13 ref.

**7194 Stereophonic Nomenclature.** N. M. Haynes. *Audio Engineering*, v. 38, Jan. 1954, p. 19, 54-55.

Complete lexicon of terms to end present confusion of jargon on stereophonic and binaural sound. 3 ref.

**7195* Contribution to the Study by the Infrared Absorption of Reciprocal Actions Between Plastic Materials and Their Solvents.** B. Laugrost. *Bulletin de la société chimique de France*, 1953, nos. 11-12, Nov.-Dec., p. 1046-1050.

Examines spectra of two cyclohexanones. Diagram, graphs. 22 ref.

**7196 The Effect of Sunrise on the Reflection Height of Low Frequency Waves.** S. B. Brown and W. Petrie. *Canadian Journal of Physics*, v. 32, Jan. 1954, p. 90-98.

Pre-sunrise effect at 95 km. is explained as a negative ion phenomenon. Rate of fall of reflection height. Tables, diagram. 12 ref.

**7197* Superficial Anistropy of Ferromagnetic Substances.** (French.) Louis Néel. *Comptes rendus*, v. 237, no. 23, Dec. 9, 1953, p. 1468-1470.

Theoretical examination of magneto-crystalline and magneto-elastic energies. 2 ref.

**7198* The Raman Spectrum of Liquid Selenium Tetrafluoride.** J. A. Rolfe, L. A. Woodward, and D. A. Long. *Faraday Society, Transactions*, v. 49, Dec. 1953, p. 1388-1390.

Spectrum, obtained both photographically and by photoelectric recording, shows seven frequencies. Table, graph. 10 ref.

**7199 Brightness Waves and Transitory Phenomena in the Quenching of Luminescence by Alternating Electric Fields.** G. Destriau. *Journal of Applied Physics*, v. 25, Jan. 1954, p. 67-71.

Zinc or cadmium sulfide phosphors are less sensitive to ultraviolet light or to X-rays when they are submitted to action of an alternating electric field. Graphs, oscilligrams. 6 ref.

**7200 On Reciprocity Theorems in Electromagnetic Theory.** T. H. Crowley. *Journal of Applied Physics*, v. 25, Jan. 1954, p. 119-120.

Five different types of sources of fields are discussed briefly. Corresponding reciprocity theorem given. 5 ref.

**7201 Infrared Absorption Spectra of Alkysilanes.** Samuel Kaye and Stanley Tannenbaum. *Journal of Organic Chemistry*, v. 18, Dec. 1953, p. 1750-1754.

Results of experimental studies. Graphs. 6 ref.

**7202* Light Scattering From Non-Gaussian Chains.** H. Benoit and P. Doty. *Journal of Physical Chemistry*, v. 57, Dec. 1953, p. 958-963.

Mathematical analyses. Graphs, diagrams. 34 ref.

**7203 On the Axisymmetric Problem of Elasticity Theory for a Medium With Transverse Isotropy.** R. A. Eubanks and E. Sternberg. *Journal of Rational Mechanics and Analysis*, v. 3, Jan. 1954, p. 89-101.

Mathematical discussion. 12 ref.

**7204 The Elementary Basic Principles of the Unified Theory of Relativity. C. Introduction.** Václav Hlavatý. *Journal of Rational Mechanics and Analysis*, v. 3, Jan. 1954, p. 103-146.

Mathematical discussion of Einsteins' basic theory. 7 ref.

**7205 Description and Analysis of the First Spectrum of Chromium, CrI.** Carl C. Kiess. *Journal of Research, National Bureau of Standards*, v. 51, Nov. 1953, p. 247-305.

Wave lengths and intensities for about 4,400 lines of CrI between 11610 A in the infrared and 1880 A in the ultraviolet. Tables, photograph. 45 ref.

**7206* Imperfections in Matter.** G. W. Rathenau. *Philips Technical Review*, v. 15, Oct. 1953, p. 105-113.

Phenomena inherent in idealized solids and others which are due to disturbances or imperfections in the system. Micrographs, graphs. 27 ref.

**7207 On Onsager's Relations in a Magnetic Field.** (English.) P. Mazur and S. R. De Groot. *Physica*, v. 19, no. 10, Oct. 1953, p. 961-970.

Application of Onsager's reciprocal relations in thermodynamics of irreversible processes is given special attention. 6 ref.

**7208 On the Statistical Mechanics of Matter in an Electromagnetic Field. I. Derivation of the Maxwell Equations From Electron Theory.** (English.) P. Mazur and B. R. A. Nijboer. *Physica*, v. 19, no. 10, Oct. 1953, p. 971-986.

Mathematical analysis. 16 ref.

**7209 Ratio of Exchange Integrals in Connection With Angles Between Partial Magnetizations in Ferrimagnetic Spinels.** (English.) K. F. Niessen. *Physica*, v. 19, no. 10, Oct. 1953, p. 1035-1045.

A *mixed* crystal spinel containing *two* kinds of magnetic ions is considered. Diagrams. 3 ref.

**7210 Magnetic Behaviour of Some Ferrites.** (English.) K. F. Niessen. *Physica*, v. 19, no. 11, Nov. 1953, p. 1127-1132.

From course of the Curie temperature of a series of mixed crystals of Ni ferrite and Ni titanate, distribution of Ti among tetrahedral and octahedral sites of the spinel was derived. Tables. 5 ref.

**7211 Electrical Resistivity and Hall Coefficient of Sodium Tungsten Bronze.** W. R. Gardner and G. C. Danielson. *Physical Review*, v. 93, ser. 2, Jan. 1, 1954, p. 46-51.

Single crystals were measured as a function of temperature and Na concentration. Diagram, table, graphs. 19 ref.

**7212 Lattice-Scattering Mobility in Germanium.** F. J. Morin. *Physical Review*, v. 93, ser. 2, Jan. 1, 1954, p. 62-63.

Temperature dependence of lattice-scattering mobility as determined from conductivity. Graphs. 7 ref.

## *Physics*

**7213 Infrared Photoconductivity Due to Neutral Impurities in Germanium.** E. Burstein, J. W. Davisson, E. E. Bell, W. J. Turner, and H. G. Lipson. *Physical Review*, v. 93, ser. 2, Jan. 1, 1954, p. 65-68.

Studies carried out at liquid He temperature over range of 1 to 38 $\mu$ for *n*- and *p*-type Ge. Graphs, table, diagram. 16 ref.

**7214 Relaxation Effects in *Para*- and Ferromagnetic Resonance.** N. Bloembergen and S. Wang. *Physical Review*, v. 93, ser. 2, Jan. 1, 1954, p. 72-83.

Experiments at 3-cm. wave length, in samples at very high and 700 K. Oscillograms, diagram, graphs, table. 32 ref.

**7215 Coherence in Spontaneous Radiation Processes.** R. H. Dicke. *Physical Review*, v. 93, ser. 2, Jan. 1, 1954, p. 99-110.

Energy levels corresponding to certain correlations between individual molecules. Diagram. 15 ref.

**7216 A Stokes-Parameter Technique for the Treatment of Polarization in Quantum Mechanics.** U. Fano. *Physical Review*, v. 93, ser. 2, Jan. 1, 1954, p. 121-123.

Technique adapts Stokes method to quantum mechanics and serves to calculate polarization effects by means of Pauli matrices. 8 ref.

**7217 On the Electron Affinities of Atomic Fluorine, Oxygen and Lithium.** B. L. Moiseiwitsch. *Physical Society, Proceedings*, v. 67, no. 409A, Jan. 1954, p. 25-32.

Ritz variational method in conjunction with an extrapolation procedure was used to calculate given values. Tables. 23 ref.

**7218 The Ultra-Violet Spectrum of a Diatomic Hydride Excited in Hydrogen-Potassium Fluoride Hollow-Cathode Discharges.** R. F. Barrow and A. D. Caunt. *Physical Society, Proceedings*, v. 67, no. 409A, Jan. 1954, p. 68-73.

Many-lined spectrum in region 2200 to 2600A was obtained. Tables. 2 ref.

**7219 On the Theory of Optical Absorption in Metals and Semiconductors.** R. Wolfe. *Physical Society, Proceedings*, v. 67, no. 409A, Jan. 1954, p. 74-84.

Quantum-mechanical methods for calculating effect on optical adsorption of metals and semi-conductors by any of the factors responsible for electrical resistance. Table. 9 ref.

**7220 Inelastic Magnetic Scattering of Neutrons From a Ferromagnetic Crystal.** W. Marshall. *Physical Society, Proceedings*, v. 67, no. 409A, Jan. 1954, p. 85-91.

Wave functions and energy eigen values at low temperature are presented. Table. 6 ref.

**7221 The Absorption of Sound in Carbon Dioxide Contained in Narrow Tubes.** L. E. Lawley. *Physical Society, Proceedings*, v. 67, no. 409B, Jan. 1954, p. 65-69.

Measurements of ultrasonic adsorption in narrow tubes of the order of 1 mm. diameter. Graphs, tables. 7 ref.

**7222 Solid State Electronics.** K. K. Darrow. *Research*, v. 7, Jan. 1954, p. 2-9.

Difference between ionic and electronic conductors. Graphs. Discusses the latter. Graphs.

**7223 On Statistical Estimation in Physics.** M. Annis, W. Cheston, and H. Primakoff. *Reviews of Modern Physics*, v. 25, Oct. 1953, p. 818-830.

Problem of estimation of parameters determined statistically from physical measurements. Graphs. 5 ref.

**7224* Recent Advances in Science: Physics.** F. A. Vick. *Science Progress*, v. 42, Jan. 1954, p. 59-65.

Reviews work done on field emission of electrons.

**7225* Measuring the Hall Effect in Cylinders Without External Magnetic Field.** (German.) Georg Busch and Rudolf Jaggi. *Zeitschrift für angewandte Mathematik und Physik*, v. 4, no. 6, 1953, p. 425-433.

Simple methods of measuring d.c. and a.c. Hall-voltages. Diagrams, graph. 5 ref.

### *Books and Miscellaneous Publications*

**7226 Modern Mass Spectrometry.** G. P. Barnard. 326 p. 1953. Institute of Physics, London. (QC451 B25m)

Main purpose of this fully illustrated monograph, is to collect together and discuss critically the substantial body of knowledge and technique about the mass spectrometer and its uses in most branches of pure and applied science.

**7227 Light. The Student's Physics.** R. W. Ditchburn. v. 1, 680 p. 1953. Blackie & Son, Ltd., London. (QC355 D63L)

Chapters cover historical introduction; wave theory—introduction; wave theory—combination of wave motions; representation of light by wave trains of finite length; interference; diffraction; Huygens' principle and Fermat's principle; accuracy of optical measurements; measurements with interferometers; velocity of light; relativistic optics; polarized light; electromagnetic theory; electromagnetic theory of reflection and refraction; electromagnetic theory of absorption and dispersion; anisotropic media; interaction of radiation and matter; quantum theory of radiation; and interaction process in relation to quantum mechanics.

**7228 A Theoretical Study of Interphase Mass Transfer.** Robert W. Schrage. 103 p. 1953. Columbia Univ. Press, New York. (QD501 Sch69t)

Determines under what conditions, if any, the assumption of thermodynamic equilibrium is inadequate. Discussion is limited to gas-liquid and gas-solid systems because these are most susceptible to theoretical examination.

***See also:***
**6109** (inspired spetcrum of aneurin)
**6926** (electron momentum distribution)

## PLASTICS

**7229 The Molecular Structure of Polyethylene. I. Chain Branching in Polyethylene During Polymerization.** M. J. Roedel. **II. Determination of Short Chain Branching.** W. M. D. Bryant and R. C. Voter. **III. Determination of Long Chain Branching.** F. W. Billmeyer, Jr. **IV. Kinetic Calculations of the Effect of Branching on Molecular Weight Distribution.** J. K. Beasley. **V. The Effect of Chain Branching and Molecular Weight on Physical Properties.** C. A. Sperati, W. A. Franta, and H. W. Starkweather, Jr. *American Chemical Society, Journal*, v. 75, Dec. 20, 1953, p. 6110-6133.

Short and long chain branching are differentiated; their determination is described; and effects of these on polymer properties. Tables, graphs. 77 ref.

**7230 How to Machine Acrylic Plastics.** Orville L. Pierson. *American Machinist*, v. 98, Feb. 1, 1954, p. 114-120.

Includes tables, diagrams, photographs.

**7231 Plastics Material Sales Increasing.** *British Plastics*, v. 27, Jan. 1954, p. 1-5.

Compares production index of plastics with general manufacturing and export indexes from 1948 to 1953. Wider application of plastics and increased consumption. Tables, graphs.

**7232* Reactions of Fluorocarbon Radicals. XII. The Synthesis of Fluorocarbons and of Fully Fluorinated Iodo-, Bromo-, and Chloro-alkanes.** R. N. Haszeldine. *Chemical Society, Journal*, 1953, Dec., p. 3761-3768.

Compounds with 3 to 16 carbon atoms are described. Graph, tables. 15 ref.

**7233* Properties of Ion-Exchange Resins in Relation to Their Structure. VI. Anion-Exchange Resins Derived From Styrene-Divinylbenzene Copolymers.** K. W. Pepper, H. M. Paisley, and M. A. Young. *Chemical Society, Journal*, 1953, Dec., p. 4097-4105.

Copolymer was chloromethylated and reacted with quaternary amines. Graphs, tables. 6 ref.

**7234* Plastic Bearings in Giant Rolling Mills.** K. Platz. *Chemische Technik*, v. 5, no. 11, Nov. 1953, p. 681-683.

Factors to be considered in successful use. Diagrams, tables.

**7235 The Polyethylene Gamble.** *Fortune*, v. 49, Feb. 1954, p. 134-137, 166, 170, 172, 174.
Future possibilities of this resin. Photographs, graph, diagrams.

**7236 High Speed Fusing, Embossing and Laminating of Vinyl Materials.** *Industrial Heating*, v. 21, Jan. 1954, p. 117-120.
Use of far-infrared electric radiant heaters for fusing and embossing cast and calendered materials. Photographs, diagram.

**7237 Polythiolesters. III. Further Studies on Preparation in Emulsions.** C. S. Marvel and Eugene A. Kraiman. *Journal of Organic Chemistry*, v. 18, Dec. 1953, p. 1664-1669.
Results of experimental studies. Tables. 5 ref.

**7238 Silicon-Containing Condensation Polymers.** Stanley B. Speck. *Journal of Organic Chemistry*, v. 18, Dec. 1953, p. 1689-1700.
Includes tables. 13 ref.

**7239 Copolymerizations of Conjugated Unsaturated Carbonyl Systems Containing Thiophene Units.** C. S. Marvel, James M. Quinn, and John S. Showell. *Journal of Organic Chemistry*, v. 18, Dec. 1953, p. 1730-1738.
Results of experimental studies. Tables. 16 ref.

**7240* Thermal Degradation of Polymethyl Methacrylates.** S. Bywater. *Journal of Physical Chemistry*, v. 57, Dec. 1953, p. 879-882.
Includes graphs. 9 ref.

**7241* Thermodynamics of Crystallization in High Polymers. Cellulose Trinitrate.** (English.) P. J. Flory, R. R. Garrett, S. Newman, and L. Mandelkern. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 97-107; disc., p. 107.
Includes tables, graphs. 10 ref.

**7242* Thermodynamic Properties of Polystyrene Solutions.** (English.) C. E. H. Bawn and M. A. Wajid. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 109-120; disc., p. 121.
Includes graphs, table. 17 ref.

**7243* Polymer Association. I. Osmotic Pressure of Solutions of Mixed Acidic and Basic Polymers.** (English.) H. Morawetz and R. H. Gobran. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 133-147; disc., p. 147-148.
Includes tables, graphs.

**7244* The Termination Reaction in Radical Poylmerizations. Polymerizations of Methyl Methacrylate and Styrene at 25°.** (English.) J. C. Bevington, H. W. Melville, and R. P. Taylor. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 449-459; disc., p. 479-480.
Includes tables, graphs. 12 ref.

**7245* Developments in the Theory of Cationic Polymerization. II.** (English.) P. H. Pelsch. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 481-487.
Olefins can only be polymerized by metal halides if a third substance, the co-catalyst, is present. 26 ref.

**7246* Degradation of Vinyl Polymers in Solution.** (English.) G. Tasset and G. Smets. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 517-531; disc., p. 531.
Includes tables, diagram, graphs. 14 ref.

**7247* The Role of Free Radicals in the Degradation of High Polymers by Ultrasonics and by High-Speed Stirring.** (English.) P. Alexander and M. Fox. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 533-541; disc., p. 541.
Includes tables. 19 ref.

**7248* Thermal and Oxidative Decomposition of Polyvinyl Chloride.** (English.) E. J. Arlman. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 547-557; disc., p. 557-558.
Results of experimental studies. Photographs, graphs, table. 4 ref.
Discusses results of experimental studies. Photographs, graphs, table. 4 ref.

**7249* Preparation and Properties of Polygalacturon Acid Amides.** (German.) J. Solms and H. Deuel. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 559-564.
Includes tables. 10 ref.

**7250* Symposium on Macromolecules. International Union of Pure and Applied Chemistry.** Stockholm-Uppsala, July-Aug. 1953. *Journal of Polymer Science*, v. 12, Jan. 1954, 638 p.

**7251 New Techniques in Fabricating Honeycombs.** Roger C. Steele. *Modern Plastics*, v. 31, Feb. 1954, p. 101-104, 193.
Savings in time, labor, and costs by using sandwich panel construction. Photographs.

**7252 Adhesives Advance. III. Glass Bonding.** Frank Moser. *Modern Plastics*, v. 31, Feb. 1954, p. 107-109, 199.
Glass bonding with synthetic resin adhesives. Photographs.

**7253 Flame-Spraying of Polyethylene.** Randolph A. Wiese. *Modern Plastics*, v. 31, Feb. 1954, p. 117-119, 122, 124.
Process is applicable to porous or non-porous surfaces and does not degrade the plastic. Photographs, diagrams.

**7254 Why South Florida Exposure Tests?** E. M. DeNoon. *Organic Finishing*, v. 15, Jan. 1954, p. 23-26.
Efficient as accelerated laboratory methods of evaluation may be, it is important that they be supplemented by natural exposure to the elements under various conditions before a wholly complete picture of their behavior may be obtained. Photographs.

**7255* Extrusion Practice in Europe.** E. Davey-Turner. *SPE Journal*, v. 10, Feb. 1954, p. 18-22, 41-42.
Engineering aspects of plastics extrusion. Drawing, photographs.

**7256* Liquid Polymers Combined With Epoxy Resins.** J. S. Jorczak and J. A. Belisle. *SPE Journal*, v. 10, Feb. 1954, p. 23-29, 38.
Discusses liquid poly-epoxide resins and polythiol polysulfide polymers. Tables, graphs.

**7257* Transformation of Polychlorvinyl Into Three Dimensional Polymers.** (Russian.) A. Ia. Drinberg and A. M. Bocharova. *Zhurnal Prikladnoi Khimii*, v. 26, no. 10, Oct. 1953, p. 1056-1060.
Benzoyl peroxide had little effect. Zinc oleate increased transformation and lowered temperature from 170 to 150 C. Tables. 8 ref.

*Books and Miscellaneous Publications*

**7258 Plastics Progress, 1953.** Phillip Morgan, editor. 439 p. 1953. Iliffe & Sons, Ltd., London. (TP986 P69)
Papers and discussions at the British Plastics Convention, 1953.

***See also:***
**6044** (surface conditions and strength of plastics)
**6129** (polymerization of styrene)
**6134** (ion-exchange in liquid $NH_3$)
**6191** (diffusion in cation exchanger)
**6192** (diffusion in anion exchangers)
**6193** (diffusion in cation exchangers)
**6194** (diffusion in cation exchangers)
**6212** (polymerization rates)
**6294** (vinyl resins for corrosion control)
**6839** (plastic patterns)
**7195** (infrared study of plastics and solvents)

## POLLUTION AND WASTES

**7259 Use of Molybdates for Estimating Amount of Olefinic-Type Hydrocarbons in Air.** Robert D. MacPhee. *Analytical Chemistry*, v. 26, Jan. 1954, p. 221-225.
Reports estimation of micro quantities of olefinic hydrocarbons is important in studies of atmospheric pollution, as these hydrocarbons oxidize under proper conditions, giving compounds that can cause crop damage, eye irritation, and reduced visibility. Photographs, tables, graph. 22 ref.

**7260* The Recovery of Wool Wax From Scour Liquors.** L. F. Evans and W. E. Ewers. *Australian Journal of Applied Science*, v. 4, Dec. 1953, p. 552-580 + 1 plate.
Includes diagrams, tables, graphs, photograph. 10 ref.

## *Pollution and Wastes*

**7261* Waste Heat Utilisation.** *Ceramics*, v. 5, Dec. 1953, p. 444-450.

Includes diagrams, tables.

**7262 Chemical-Toxicological and Engineering Conferences, Transactions,** (Annual Volume), v. 17, 1952. 47 p. Industrial Hygiene Foundation of America, Pittsburgh 13, Penna.

Round table discussion on effects of gases encountered in fires and hot processes; protection against fire gases; specialized laboratory equipment utilization; significance of expsoures to dusts of low silica content; toxicology of halogenated aliphatic hydrocarbons; exhaust designing for Be fumes, dusts, and mists; stream pollution from industrial sources; and noise reduction at General Motors Corp.

**7263* Dextran.** John N. Cronk. *Chemurgic Digest*, v. 12, Dec. 1953, p. 6-8.

Unbounded power of products of agriculture to aid mankind is told in development of dextran, potentially the greatest contribution of our age to the welfare of our people. Photographs.

**7264* Pittsburgh Plans Unique Project to Abate Stream Pollution.** John F. Laboon. *Civil Engineering*, v. 24, Jan. 1954, p. 44-47, 100.

Design and operation of proposed system, construction of which will begin this year. Diagrams, photograph.

**7265 Making Money With Waste.** *Coal Age*, v. 59, Feb. 1954, p. 108-111.

Addition of tables, cyclones, and filter to present preparation facilities. Photographs, diagrams, tables.

**7266 Steelworks Waste-Heat Boiler Practice.** R. McDonald. *Iron and Steel Institute, Journal*, v. 176, Jan. 1954, p. 71-88.

Discusses historical background, design and layout of plants, and operational conditions. Investigations into further extraction of heat after waste gases leave boiler are discussed. Concludes with operational details derived from an economizer recently installed to operate in series with waste-heat boiler. Diagrams, graphs, oscillographs, photograph. 7 ref.

**7267 Diatometer—Inexpensive River Pollution Indicator.** Eugene B. Brien. *Petroleum Engineer*, v. 26, Jan. 1954, p. C35-C36.

Quick method to evaluate wastes from refinery discharges. Photographs.

**7268* Industry's Concern in Pollution Abatement and Water Conservation Measures.** Leonard B. Dworsky. *Public Health Reports*, v. 69, Jan. 1954, p. 37-47.

Summarizes current legislation and investigations in the field. Discusses limited areas concerned with pollution's effects on industrial water use and conservation measures which industry may apply in order to provide for balanced use of surface and underground water resources. Diagram. 36 ref.

**7268a* Determination of Degree of Pollution of Atmosphere of Cities. Discussion of a Few of Results Obtained.** (French.) Edm. Leclerc. *Revue universelle des mines*, v. 9, ser. 9, no. 12, Dec. 1953, p. 801-808.

Methods of measuring air pollution and influence of altitude and climate on results. Photographs, diagram, tables. 6 ref.

**7269* High-Rate Activated Sludge Treatment and Its Relation to Stream Sanitation. I. Pilot-Plant Studies.** K. Wuhrmann. *Sewage and Industrial Wastes*, v. 26, Jan. 1954, p. 1-27.

Pilot-plant studies show that with rather short aeration periods B.O.D. reductions of at least 80% can be achieved with settled domesitc sewage, provided there is sufficient concentration of solids in the mixed liquor. Graphs, diagram, tables, photographs. 38 ref.

**7270* Research on Activated Sludge. III. Distribution of Oxygen in Activated Sludge Floc.** A. Pasveer. *Sewage and Industrial Wastes*, v. 26, Jan. 1954, p. 28-33; disc., p. 33.

Theoretical considerations show high intensification of turbulence in mixed liquor may be a most influential factor in promoting transfer of oxygen to floc and thus increase rate of biochemical oxidation. With high turbulence size of floc will become smaller and a higher concentration of oxygen in water/floc interfacial surface will be maintained, as a result of which supply of oxygen to the floc will remain high. Tables, graph. 8 ref.

**7271* Trickling Filter Studies on Fine Chemical Plant Wastes.** F. E. Reimers, U. S. Rinaca, and L. E. Poese. *Sewage and Industrial Wastes*, v. 26, Jan. 1954, p. 51-58.

Pilot-plant studies indicate combined liquid wastes from manufacture of antibiotics, vitamins, and sulfa drugs can be satisfactorily treated by trickling filters. Tables, photographs, diagram. 9 ref.

**7272* Disposal of Waste Water from Oil Fields in the Coastal Counties of California.** Richard Pomeroy. *Sewage and Industrial Wastes*, v. 26, Jan. 1954, p. 59-70.

Routes of disposal; amount and nature of waste water; problems of waste disposal; and cooperation with pollution control agencies and sewer authorities. Graphs, map. 8 ref.

**7273* Water and Waste in the Wood Pulp Industry.** Harold R. Murdock. *Sewage and Industrial Wastes*, v. 26, Jan. 1954, p. 71-80; disc., p. 80-82.

Includes graphs, tables. 8 ref.

**7274* The Equitable Use of Streams.** Seth G. Hess. *Sewage and Industrial Wastes*, v. 26, Jan. 1954, p. 83-88.

A rational method for allocating absorptive power or capacity of a stream to assimilate pollution.

**7275 Diamond Sludge Recovery.** F. J. Lennon, Jr. *Tooling and Production*, v. 19, Nov. 1953, p. 60.

Recovery of diamond particles from sludge of grinding wheels. Photograph.

**7276 Regeneration of Spent Pickle Liquor.** B. P. Martinez. *U. S. Bureau of Mines, Information Circular* 7672, Dec. 1953, 18 p. + 4 plates. (TN21 Un3i)

Process is based largely on negative solubility slope of ferrous sulfate in temperature range 160 to 240 F. Diagrams. 21 ref.

**7277* Fundamental Principles of Handling Chlorine. V. Dosage Control.** V. W. Langworthy. *Water & Sewage Works*, v. 101, Jan. 1954, p. 36-39.

Proper control of additions to water or wastes. Photographs.

**7278* Smog Control Near 100% for Steel Mills & Foundries.** Martin A. Brower. *Western Metals*, v. 21, Jan. 1954, p. 48-50.

Developments in equipment and practices in 1953. Photographs.

***See also:***
**6620** (electrostatic precipitation)

## RUBBER AND ELASTOMERS

**7279 The Effect of Temperature on the Air Aging of Rubber Vulcanizates.** A. E. Juve and M. G. Schoch, Jr. *ASTM Bulletin*, 1954, no. 195, p. 54-61.

Data show that for synthetic elastomers, deterioration is essentially the same over the range of room temperature to 150 C. Graphs, tables. 10 ref.

**7280* The Crosslinking of Rubber by Pile Radiation.** Arthur Charlesby. *Atomics (British)*, v. 5, Jan. 1954, p. 12-21, 27.

Mathematical analysis of variation of gel fraction with crosslinking index; average molecular weight of sol fraction; and crosslinking of the gel. Results obtained apply to other long-chain polymers whose molecular weight follows a random probability (Poisson) distribution. Graphs, tables.

**7281* Silicone Rubber as Electrical Insulation.** Alex. E. Javitz. *Electrical Manufacturing*, v. 53, Feb. 1954, p. 126-132.

Applications in motors, transformers, appliances and other products are steadily expanding as new basic compounds are being improved. Tables, photographs. 7 ref.

**7282* Departures of the Elastic Behaviour of Rubbers in Simple Extension From the Kinetic Theory.** S. M. Gum-

brell, L. Mullins, and R. S. Rivlin. *Faraday Society, Transactions*, v. 49, Dec. 1953, p. 1495-1505.

Equilibrium stress-strain behavior of highly swollen rubber vulcanizates in simple extension agrees with predictions of kinetic theory. Diagram, graphs, tables. 10 ref.

**7283 Biosynthesis of Rubber and Other "Isoprenoid" Compounds.** F. J. Ritter. *India-Rubber Journal*, v. 126, Jan. 9, 1954, p. 7-11, 22-23.

Structure and genetic relationship of terpenes; occurrence and localization of rubber and gutta-percha in various plants; synthesis of rubber in the plant; and biosynthesis of other terpenes are discussed. Table. 37 ref.

**7284* Compounding of Silicone Gums.** C. W. Pfeifer, R. M. Savage, and B. B. White. *India Rubber World*, v. 129, Jan. 1954, p. 481-484, 488.

Available silicone gums and some basic information concerning their properties, mixing and handling. Photographs, tables, graph.

**7285 Introduction to the Mechanism of the Hydrochlorination of Rubber.** Manfred Gordon and James S. Taylor. *Journal of Applied Chemistry*, v. 3, Dec. 1953, p. 537-545.

Coiling of a rubber chain segment into *trans*-decalin-shaped transition state is shown to be necessary to explain alternation along polymer chain of *D*-and *L*-asymmetric carbon atoms. Graphs, diagram. 19 ref.

**7286 The Proton Magnetic Resonance in Natural Rubber.** H. S. Gutowsky and L. H. Meyer. *Journal of Chemical Physics*, v. 21, Dec. 1953, p. 2122-2126.

Resonance has been observed in natural rubber from liquid N temperature to room temperature. Tables, graphs.

**7287 Cellular Rubber Shows Versatility as an Engineering Material.** G. R. Sprague and A. F. Sereque. *Mechanical Engineering*, v. 76, Feb. 1954, p. 147-151.

Properties and uses of this rubber in industry. Photographs, graphs, table.

**7288* Studies on Silicone Rubber. I. Polycondensation of Linear Polydimethylsiloxanediol. II. Preparation of Silicone Rubber From Linear Polydimethylsiloxanediol.** (Japanese.) Tsunao Araki and Kiyoshi Ohsuga. *Reports of the Government Chemical Industrial Research Institute, Tokyo*, v. 48, no. 9, Dec. 1953, p. 343-357.

Polydimethylsiloxanediol is prepared by action of 0.3% $FeCl_3$-$6H_2O$ on hydrolyzed dimethyldichlorosilane at 60 C. Rubber is made by action of benzoyl peroxide and curing on the above when filled with $TiO_2$ and $SiO_2$. Diagrams, graphs, tables. 8 ref.

**7289 Rubber-Resin Blends: A Panel Discussion Held by the Akron Rubber Group. Blends of Phenolic Resins With Rubber,** R. C. Bascom; **Blends of Styrene-acrylonitrile Resins With Rubbers,** Willard De Camp Crater; **Blends of Styrene-Butadiene With Rubbers—Rigid Compounds,** C. R. Holt; **Blends of Styrene-Butadiene Resins With Rubbers—Non-Rigid Compounds,** Harold S. Sell; **Blends of Polyvinyl Chloride With Rubbers,** Walter J. Smith; **and Resin-Rubber Rigid Blends—A Summary,** Anthony J. Urbanic. *Rubber Age*, v. 74, Jan. 1954, p. 547-554; disc., p. 555-559.

**7290 The Reinforcement of Butyl With Carbon Black. IV. Effect of Polymer Composition and Molecular Weight on Efficiency of Heat Treatment.** John Rehner, Jr. and A. M. Gessler. *Rubber Age*, v. 74, Jan. 1954, p. 561-566.

Includes tables, graphs. 6 ref.

**7291 Engineering Developments of Rubber: July, 1952—June, 1953.** Betty Jo Clinebell. *Rubber Age*, v. 74, Jan. 1954, p. 568-573.

General review of cold rubber and other elastomers, product developments, and testing and evaluation. 114 ref.

**7292 Even Air Is Costly.** *Buildings*, v. 54, Feb. 1954, p. 26-27.

Use of electronic air cleaners. Photographs.

***See also:***
**7334** (bonding rubber to metal)

## SPACE HEATING AND CONDITIONING

**7293 Recent Progress in Solar Furnaces for High-Temperature Research and Development Work.** Willi M. Conn. *Franklin Insttiute, Journal*, v. 257, Jan. 1954, p. 1-12.

Compilation and evaluation of factors entering into design of experimental solar furnaces. Development of solar furnaces for semi-industrial use in which the one-piece mirror has been replaced by a collector consisting of a large number of small curved mirrors. Diagrams, tables, photographs. 8 ref.

**7294* Air Conditioning. Tremendous Market.** W. A. Collins, Jr. *Gas Age*, v. 113, Jan. 28, 1954, p. 24-26, 48-49.

Role of gas in air conditioning industry. Map, graph.

**7295 Heating With Atomic Energy.** Robert T. Jaske. *Heating, Piping & Air Conditioning*, v. 26, Feb. 1954, p. 77-80.

One of the first systems to utilize heat from atomic reactors for space heating. Photographs, diagrams.

**7296 Cooling a Small Residence Using a Perimeter-Loop Duct System.** D. R. Bahnfleth, C. F. Chen, and H. T. Gilkey. *Heating, Piping & Air Conditioning*, v. 26, Feb. 1954, p. 111-121.

Includes photograph, diagrams, tables. 13 ref.

**7297 Design and Economics of Solar Energy Heat Pump Systems.** R. C. Jordon and J. L. Threlkeld. *Heating, Piping & Air Conditioning*, v. 26, Feb. 1954, p. 122-130.

Architectural considerations, component requirements, operating costs, and general feasibility of solar energy heat pump systems. Diagrams, tables, maps, graph. 6 ref.

**7298 Effects of Non-Uniformity and Furnishings on Panel Heating Performance.** L. F. Schutrum and C. M. Humphreys. *Heating, Piping & Air Conditioning*, v. 26, Feb. 1954, p. 131-136.

Work evaluates effect of non-uniform surface temperatures, floor coverings, and room furnishings. Graphs, tables. 3 ref.

**7298a New Concept of Comfort Conditioning.** G. Lorne Wiggs. *Heating, Piping & Air Conditioning*, v. 26, Jan. 1954, p. 143-151.

Detailed description of a new ceiling system which combines radiant heating and cooling, recessed water cooled fluorescent lighting units, acoustic treatment and diffusers, and ducts for supply of conditioned air. Photographs, diagrams.

**7299 High Temperature Hot Water.** S. A. Kuli. *Heating, Piping & Air Conditioning*, v. 26, Jan. 1954, p. 156-159.

Steam pressurized systems for space heating applications. Graph, diagrams.

**7300 Heat Flow Characteristics of Hot Water Floor Panels.** E. L. Sartain and W. S. Harris. *Heating, Piping & Air Conditioning*, v. 26, Jan. 1954, p. 183-191.

Tests made on a floor panel heating system installed in the floor slab laboratory at Univ. of Ill. Tables, graphs, diagrams, photograph.

**7301 Utilization of Solar Energy for House Heating.** J. L. Threlkeld and R. C. Jordan. *Heating, Piping & Air Conditioning*, v. 26, Jan. 1954, p. 193-201.

Methods of utilizing solar energy for house heating and major components of solar energy-heat pump systems. Tables, graphs. 20 ref.

**7302* Performance of Reflectortype Direct Solar Cooker.** M. L. Ghai, Mohan Lal Khanna, J. S. Ahluwlaia, and S. P. Suri. *Journal of Scientific & Industrial Research*, v. 12, sec. A, Dec. 1953, p. 540-551.

Type of reflector, size and shape of cooking utensil, intensity of direct solar radiation, and atmospheric conditions are design considerations for this new food cooker. Diagrams, tables, graphs. 7 ref.

**7303* Mechanical Refrigeration. VIII. The Selection of Standard Equipment for Commercial Refrigeration Applications.** John A. Stonebanks. *Modern Refrigeration*, v. 57, Jan. 1954, p. 28-32, 42.

Includes graphs.

### *Space Heating and Conditioning*

**7304* American Box Board Completes $6 Million Expansion Program.** *Paper Mill News*, v. 77, Jan. 30, 1954, p. 8-10, 12, 14, 16-17.

Integrated pulp and board mill and new Black-Clawson Fourdrinier are now operating at Filer city, Mich. Photographs.

**7305* Determination of Water Content in Freon-12 Circulating in a Refrigeration System.** Albert W. Diniak, Ernest E. Hughes, and Minoru Fujii. *Refrigerating Engineering*, v. 62, Feb. 1954, p. 56-59, 94.

Electrical method is discussed. Diagrams, graphs, table. 11 ref.

**7306* Sheet Metal Worker's Contractor Survey. I. Heating and Air Conditioning.** *Sheet Metal Worker*, v. 45, Jan. 1954, p. 72-78.

Discusses warm air heating and summer air conditioning. Tables, protographs, graphs. (To be continued.)

**7307* Design of Exhaust Systems. VI. Fan Characteristics.** F. H. Stebbins. *Sheet Metal Worker*, v. 45, Jan. 1954, p. 88-90, 98.

Initial cost; efficiency and operating expense; proper fan; and motor sizing. Photographs, graph, diagram, table. (To be continued.)

***See also:***
**5946** (air sterilization)
**6870** (design of air conditioning equipment)

## TEXTILES AND FIBERS

**7308* The Tear Strength of Resin-Treated Textiles.** *American Dyestuff Reporter*, v. 43, Jan. 18, 1954, p. P41-P45.

Includes tables, diagram, photograph. 33 ref.

**7309* The Absorption of Divalent Bases on Nylon Fibers.** Frederick T. Wall and Patricia M. Saxton. *Journal of Physical Chemistry*, v. 58, Jan. 1954, p. 86-90.

Absorption of strontium hydroxide on nylon fibers experimentally investigated over range 0 to 45 x $10^{-6}$ mole of base per gram of fiber. Results suggest divalent cations are absorbed by carboxyl ions in predominantly two forms, $COOSr^{+}$ and COOSrOH. Tables, graph. 11 ref.

**7310* Theory of Ionic Absorption on Wool Keratin.** (English.) Bertil Olofsson. *Journal of Polymer Science*, v. 12, Jan. 1954, p. 301-308.

14 ref.

**7311* Effect of Laundering, Perspiration & Light on Fabrics.** L. V. Tolani, H. V. K. Udupa, and P. C. Mehta. *Journal of Scientific & Industrial Research*, v. 12, sec. B, Dec. 1953, p. 631-639.

Effect has been studied by measuring changes in cuprammonium fluidity and tensile strength of the fabrics and degree of polymerization of cellulose in treated and untreated fabrics. Graphs, tables, photomicrographs. 33 ref.

**7312* Modern Techniques in the Dyeing of Orlon-Dacron.** *Modern Textiles Magazine*, v. 34, Nov. 1953, p. 60-61.

Types of dyes and methods employed.

**7313* Instrumentation: Some Practical Aspects of Time-Temperature Regulation in Dyeing.** Leo Walter. *Modern Textiles Magazine*, v. 34, Nov. 1953, p. 84, 86-88.

Discusses cooperation among dyer, dyehouse engineer, and instrument engineer in solving temperature control problems of dyeing vessels. Photograph, table, diagrams.

**7314 Physics in Textile Science.** Rogers B. Finch. *Physics Today*, v. 7, Feb. 1954, p. 12-15.

Opportunities for physicists in textile industry.

**7315* Absorptiometric Colorimetry in the Textile Laboratory.** C. H. Giles and I. S. Shaw. *Society of Dyers and Colourists, Journal*, v. 69, Dec. 1953, p. 481-491.

Describes application to determination of concentrations of dyes in solution and of dyes and certain auxiliary products on fiber; amounts of metals present on fiber; and pH values of aqueous liquids. Graphs, tables, diagrams. 32 ref.

**7316* The Reaction Between Wool and Nickelammonium Hydroxide. II. The Supercontraction of Wool Fibres in Solutions of Nickelammonium Hydroxide.** J. W. Bell and C. S. Whewell. *Society of Dyers and Colourists, Journal*, v. 69, Dec. 1953, p. 491-496.

**7317* Some Fundamental Questions Concerning the Static Electrification of Textile Yarns. II.** V. E. Gonsalves and B. J. van Dongeren. *Textile Research Journal*, v. 24, Jan. 1954, p. 1-12.

Includes diagrams, graphs. 7 ref.

**7318* Structural Details of the Surface Layers of Wool.** Gösta Lagermalm. *Textile Research Journal*, v. 24, Jan. 1954, p. 17-25.

Results of electron microscopical studies made on surface layers of wool, separated from rest of fiber by several methods. Micrographs, diagrams. 19 ref.

**7319* Preparation of Microbiologically Resistant Wool by Means of Chemical Modification. II. Paper Chromatographic Investigation of the Samples.** Helmut Zahn. *Textile Research Journal*, v. 24, Jan. 1954, p. 26-31.

Includes diagrams. 6 ref.

**7320* The Relative Responsiveness of Certain Properties of Cotton Fiber to Microbial Action.** P. B. Marsh, K. Bollenbacher, M. L. Butler, and G. V. Merola. *Textile Research Journal*, v. 24, Jan. 1954, p. 31-38.

Includes micrograph, tables, graph. 15 ref.

**7321* Improvement of Luster of Cotton. III. Correlation of Visual and Physical Aspects of Luster.** Lyman Fourt, Ruth M. Howorth, and Marjorie B. Rutherford. **IV. Effect of Weaving Pattern on Luster in a Series of Bleached Cotton Fabrics.** Lyman Fourt and Marjorie B. Rutherford. *Textile Research Journal*, v. 24, Jan. 1954, p. 61-72.

Physical measurement of contrast ratio is correlated with visual judgment of luster of white cotton yarns and fabrics. Graphs, tables. 7 ref.

**7322* Irregularity in Textile Yarns and Strands. A Literature Survey.** Malcolm A. Sanborn. *Textile Research Journal*, v. 24, Jan. 1954, p. 86-96.

Includes graphs. 85 ref.

**7323* THPC Flame-Resistant Treatment.** Wilson A. Reeves and John D. Guthrie. *Textile World*, v. 104, Feb. 1954, p. 101, 176, 178, 182.

Method gives improved resistance to flame, wrinkles, rot, and mildew.

## THERMODYNAMICS

**7324 Shortcut to Heat Exchanger Design. V.** C. H. Gilmour. *Chemical Engineering*, v. 61, Feb. 1954, p. 190-194.

Conditions of vapor deposition and condensate sub-cooling, condensates of immiscible liquids, and cross flow in shell. Graphs, tables.

**7325 Thermal Conductivity Chart for Gases.** A. I. Johnson and Chen-Jung Huang. *Chemical Engineering*, v. 61, Feb. 1954, p. 204-205.

Correlation for thermal conductivity of gases using specific heat and viscosity. Chart, table.

**7326* Temperatures Attained by Collisions of Detonation Waves.** (French.) Serge Travers. *Comptes rendus*, v. 237, no. 23, Dec. 9, 1953, p. 1492-1495.

Temperature obtained was shown to depend on specific heat and energy per unit of mass.

**7327 The Application of Jacobians to Statistical Thermodynamics.** Harvey Einbinder. *Journal of Chemical Physics*, v. 21, Dec. 1953, p. 2134-2142.

Any partial second derivative can be expressed in terms of two sets of reference derivatives based on independent variables (V,T) and (P,T), respectively. Tables. 34 ref.

**7328 On the Minimum of Entropy Creation With Transmission of Heat.** (French.) P. Glansdorff. *Physica*, v. 19, no. 10, Oct. 1953, p. 1029-1034.

Difficulties for finding minimum of entropy creation when phenomenological coefficients cannot be considered as constants. 7 ref.

**7329 Relativistic Thermodynamics of Irreversible Processes. II. Heat Conduction and Diffusion, Physical Part.** (English.) G. A. Kluitenberg, S. R. De Groot, and P. Mazur. *Physica*, v. 19, no. 11, Nov. 1953, p. 1079-1094.

Theoretical discussion. 10 ref.

**7330 Thermodynamics of Irreversible Processes in Rotating Systems.** (English.) G. J. Hooyman, H. Holton, Jr., P. Mazur, and S. R. De Groot. *Physica*, v. 19, no. 11, Nov. 1953, p. 1095-1108.

General entropy balance equation for a rotating system containing a mixture of charged and uncharged components is calculated. Influence of centrifugal force and Coriolis force on entropy production is considered. 7 ref.

**7331 On the Theory of Thermocouples and Thermocells.** (English.) H. Holtan, Jr., P. Mazur, and S. R. De Groot. *Physica*, v. 19, no. 11, Nov. 1953, p. 1109-1118.

Thermodynamical theory of irreversible processes is applied to thermocouples and thermocells. A general expression for the thermo-potential is derived. 10 ref.

*See also:*
**6475** (heat transfer in fluids)
**6484** (thermal conduction in boundary layers)
**6495** (thermodynamics of compressible fluid flow)

## WELDING AND JOINING

**7332* High-Temperature Brazing.** G. D. Cremer, F. J. Filippi, and R. S. Mueller. *Aircraft Production*, v. 16, Feb. 1954, p. 76-81.

Application of corrosion and heat resistant alloys to fabrication of sheet-metal assemblies. Photographs.

**7333 Manufacturing Applications for Metal Stitching.** Arthur G. Denne. *American Society of Tool Engineers, Technical Paper and Panel Discussion*, v. 21, 1953, 18 p.

Advantages, limitations, and standard manufacturing applications are presented. Photographs, drawings, table.

**7334 Bonding Methods for Adhering Rubber to Metal.** J. H. Gerstenmaier. *American Society of Tool Engineers, Technical Papers and Panel Discussion*, v. 21, 1953, 11 p.

Types of adhesions, design features, and a method for determining quality levels. Photographs, drawings, tables.

**7335 Properties, Processing and Uses of Metal-Bonding Adhesives.** O. W. Loudenslager. *American Society of Tool Engineers, Technical Papers and Panel Discussion*, v. 21, 1953, 13 p.

Physical properties and sandwich materials with their present and future uses. Photographs, drawings, tables. 9 ref.

**7336 Adhesives in Aircraft.** William J. Clayton and Roger K. Humke. *Aviation Age*, v. 21, Jan. 1954, p. 50-63.

Types and uses of many compounds. Photographs, table, graphs.

**7337* Fatigue Strength of Corner-Weld Joints.** (German.) *Brennstoff-Wärme-Kraft*, v. 6, no. 1, Jan. 1954, p. 22-24.

Describes experiments with four different types of joints. Photographs, diagrams, graphs.

**7338 New Arc Welding Process for Cast Iron.** K. K. Khrenov and F. S. Vol'fovskaya. *Henry Brutcher, Altadena, Cal., Translation no.* 2919, 10 p. (From *Avtogennoe Delo*, v. 23, no. 1, 1952, p. 3-6.)

Development of a new arc welding process for cast irons which gives sufficient mechanical strength, good machinability of deposited metal and heat-affected zone, and a perfect color match of deposited and base metal. Table, diagrams, micrographs.

**7339* Core Wires for Welding Electrodes.** K. L. Zeyen. *Draht (English Ed.)*, 1953, no. 17, Dec., p. 19-24.

Regulations laid down in various countries for core wires of bare and coated rods for arc welding of ferrous materials. Tables. 16 ref.

**7340* New Electric Welding and Soldering Gun.** (German.) J. C. Fritz. *Elektrotechnische Zeitschrift*, v. 6, Ausgabe B, no. 1, Jan. 21, 1954, p. 10.

Describes hard-soldering and argon and SIGMA-welding guns. Photograph. 5 ref.

**7341* Gelatins and Animal Glues.** A. G. Thomson. *Export Review*, v. 14, Jan. 1954, p. 28-30.

Raw materials, scientific control, photographic gelatin, industrial uses, and export trade. Photograph.

**7342* How Airplane Parts Are Heat Treated to Withstand High Temperatures.** *Industrial Gas*, v. 32, Jan. 1954, p. 6-7, 22-23.

Ryan Aeronautical Co., builds exhaust systems and other components for jet, piston, and rocket engines. Gas-fired ovens effect perfect bond of ceramic coating on metal, prolonging its life. Photographs.

**7343 Cracking in Stainless and Heat-Resisting Weld Metals.** H. F. Tremlett. *Institute of Welding, Transactions*, v. 16, Dec. 1953, p. 143-150; disc., p. 150-153, 174.

Paper develops idea that cracking in stainless and heat resisting welds may be prevented by proper choice of weld structure. Photographs, graphs, tables.

**7344 Weldability of High Tensile Structural Steels.** L. Reeve. *Institute of Welding, Transactions*, v. 16, Dec. 1953, p. 154-162; disc., p. 163-166.

Summarizes development of weldable high tensile structural steels, first describing standard steel which meet the requirements of BSS, 548 and 968, and then giving some details of higher yield point steels now commercially available. Graphs, tables, diagrams, photomicrographs. 12 ref.

**7345 Multipass Welding Increases Ductility.** F. W. Myers, Jr. *Iron Age*, v. 173, Jan. 21, 1954, p. 104-105.

Refinement of weld grain structure by repetitive heating and cooling in multipass welding produces many desirable characteristics. Photograph, photomicrograph.

**7346 Solid State Bonding of Aluminum to Nickel.** S. Storchheim, J. L. Zambrow, and H. H. Hausner. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Feb. 1954, p. 269-274.

Solid state bonding of Al to Ni was studied as a function of temperature, pressure, and time at pressure. Initial results indicated that as reaction conditions were varied, marked changes in tensile strength occurred. Diagram, graphs, photographs, micrographs.

**7347* Tooling and Welding Aft Frames at Ryan Aeronautical.** *Machine and Tool Blue Book*, v. 49, Jan. 1954, p. 226-231.

Includes photographs.

**7348 Close Tolerance Aluminum Parts Brazed in Salt Bath.** William J. Rudolph. *Materials & Methods*, v. 39, Jan. 1954, p. 96-99.

When properly done, dip brazing lowers unit cost, reduces scrap, and produces joints as strong as those by other methods. Photographs, diagram, table.

**7349* Evaluation of the Progressive Technique of Spot Welding.** (German.) K. Ruppin. *Metall*, v. 8, nos. 1-2, Jan. 1954, p. 30.

Principles and weldability of different metals. Tables, graphs.

**7350* Welded Construction of Electric Locomotives.** (French.) P. Fromaget. *Revue de la Soudure (Brussels)*, v. 9, no. 4, 1953, p. 157-168.

Problems of welding locomotive frames and remedial measures. Photographs, diagrams.

## *Welding and Joining*

**7351* Code Project for the International Symbolization of Coated Electrodes for Arc Welding of Mild Steels and Low Alloy High Strength Steels.** (French.) *Revue de la Soudure (Brussels)*, v. 9, no. 4, 1953, p. 179-183.

Classification consists of degree of penetration, mechanical characteristics, and operating conditions. Diagrams, tables.

**7352* Repairing Cast-Iron Parts by Welding.** (German.) Hans Höll. *Schweissen und Schneiden*, v. 5, no. 12, Dec. 1953, p. 480-483.

Various methods of hard soldering and welding. Diagrams, photographs.

**7353* Electric Arc Welding Under Protection of Rare Gases.** (German.) Wilhelm Mantel and Lothar Wolff. *Schweisstechnik*, v. 7, no. 12, Dec. 1953, p. 133-142.

Discusses advantages, procedure, equipment, and application. Shows that a.c. welding with ordinary transformers is not satisfactory with this process. Tables, photographs, diagrams, graphs.

**7354* Spot Welding of Ferritic Chrome Steels.** Hans Wängsjö *Sheet Metal Industries*, v. 31, no. 321, Jan. 1954, p. 31- 39.

Welding difficulties of this Ni-steel substitute. Photomicrographs, graphs, tables.

**7355* Cold Pressure Welding of Titanium.** J. E. Hughes. *Sheet Metal Industries*, v. 31, no. 321, Jan. 1954, p. 52-54, 60.

Cold welding as a possible industrial method for fabrication of Ti components. Photograph, tables. 3 ref.

**7356 Welded Portal Frames Tested to Collapse.** J. M. Ruzek, C. F. Braun, K. E. Kundsen, E. R. Johnston, and L. S. Beedle. *Society for Experimental Stress Analysis, Proceedings*, v. 11, 1953, p. 159-180.

Testing apparatus, measurement techniques, and testing procedure for investigation of ultimate carrying capacity of welded portal frames. Method of providing lateral support to frames and a simple device for measuring change in curvature of structural members. Photographs, diagrams, graphs, table. 13 ref.

**7357 The Welding of Nickel Alloy Steels. II.** *Steel Processing*, v. 40, Jan. 1954, p. 39-47.

Equipment and techniques employed in various processes. Tables, graphs. 4 ref.

**7358* Condenser-Impulse Welding.** (German.) F. Früngel and W. Thorwart. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 1, Jan. 1, 1954, p. 18-21.

Describes advantages, design, and results. Photographs, diagrams, graphs. 2 ref.

**7359* Inductive Welding of Pipe Seams and Its Application.** (German.) E. Hörmann. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 3, Jan. 21, 1954, p. 65-72.

Production and joining of pipes and pressure and temperature requirements. Graphs, photographs, diagrams, micrographs.

**7360* Increasing Impact Strength of Gas Welds.** (Russian.) A. N. Shashkov, Ts. S. Khromova, and S. S. Vaksman. *Vestnik Mashinostroeniia*, v. 33, on. 9, Sept. 1953, p. 81-85.

High Mn content in Si-steel welding rods was found to increase strength and plasticity of the weld. Tables, micrographs, graphs. 3 ref.

**7361 77 Years of Resistance Welding. I.** Preston M. Hall. *Welding Engineer*, v. 39, Feb. 1954, p. 54-55.

Presents historical summary. Photographs. (To be continued.)

**7362 Processes for Fusion Welding of Aluminum.** Lester F. Spencer. *Welding Engineer*, v. 39, Feb. 1954, p. 58-62, 64, 66.

Discusses oxyacetylene; metal and carbon-arc; atomic-hydrogen; and tungsten and metal inert-gas processes. Photographs, diagrams, tables. 12 ref.

**7363 Inert-Arc Field Welding of Pressure Piping.** R. T. Pursell. *Welding Journal*, v. 33, Jan. 1954, p. 41-46.

Use of paper discs as backing strips. Photographs, micrographs, diagrams, table.

**7364 Optimum Spot and Seam Welding Conditions for Inconel X.** Ernest F. Nippes and Herbert B. Fishman. *Welding Journal*, v. 33, Jan. 1954, p. 1S-14S.

Determination of optimum conditions on basis of tension-shear, cross-tension, and pillow tests. Tables, micrographs, graphs. 8 ref.

**7365 Ductility Transition of Weld Metal.** W. S. Pellini and E. W. Eschbacher. *Welding Journal*, v. 33, Jan. 1954, p. 16S-20S.

Determination of above characteristics by drop weight test method and relative resistance to fracture initiation of weld metal and structural steels. Photographs, diagrams, tables, graphs. 4 ref.

**7366 Fatigue Strength Butt Joints in ⅜-In. Thick Aluminum Alloy Plates.** E. C. Hartmann, Marshall Holt, and I. D. Eaton. *Welding Journal*, v. 33, Jan. 1954, p. 21S-30S.

Presents results of direct-stress fatigue tests. Tables, diagrams, photographs, graphs. 8 ref.

**7367 Moisture in Low-Hydrogen Welding Electrodes.** C. DeRop and H. Schmidt-Bach. *Welding Journal*, v. 33, Jan. 1954, p. 39S. (Abstracted from *Stahl und Eisen*, v. 73, Sept. 10, 1953, p. 1212-1215.)

Good bead formation without pores and results of fatigue, bend, tensile, and impact tests. Table.

*Books and Miscellaneous Publications*

**7368 Welding Engineering.** Boniface E. Rossi. 786 p. 1954. McGraw Hill. (TS227 R73we)

Presents fundamental facts about welding for the beginner and reference sources for designers.

***See also:***
**6384** (electroplatin and soldering as allied processes)
**6722** (mill for welding and sizing)
**6903** (locknuts for Ti bolts)
**6921** (fatigue strength of bonded and riveted panels)
**6959** (behavior of Al-alloy riveted joints)
**6974** (adhesives)
**6981** (manufacturing soldering wires)
**7003** (brazing of carbide tips)
**7077** (welding Cr-Mo steels)
**7118** (supersonics for testing of welds)

## WOOD AND FOREST PRODUCTS

**7369* The Story and Purpose of Paper. A Guide for Users. III. Fourdrinier.** *Jobbing Printer*, v. 5, Dec. 1953, p. 1953, p. 20-23.

Deals with kinds of fibrous raw materals used in paper-making since the introduction of woodpulp. (To be continued.)

**7370* The Laboratory Control of Pulp and Paper Manufacture.** Julius Grant. *Laboratory Practice*, v. 3, Jan. 1954, p. 14-20.

Discusses optical properties; penetration and absorbency tests; and fibre identification. Micrographs, diagrams. 9 ref.

**7371* Packaging and Paper.** Charles W. Boyce. *Paper Mill News*, v. 77, Jan. 16, 1954, p. 12-14, 16, 18.

Historical background and analysis of the industry. Graphs.

**7372* The Preparation, Handling, and Transportation of Pulpwood East of the Rockies.** J. A. Holekamp *Paper Mill News*, v. 77, Jan. 23, 1954, p. 48, 50, 52, 54, 56-57.

Growing shortage of manpower, increased cost of labor, and demand for quantities of pulpwood exceeding all previous records will necessitate replacements of manpower with machine power in a number of operational steps required in the production of pulpwood. Photographs.

**7373* Kraft Pulp Bleaching.** Malcolm B. Pineo. *Paper Trade Journal*, v. 138, Jan. 22, 1954, p. 14-20.

A brief yet comprehensive up-to-date survey. Tables.

**7374* Salt Exchange Between Ligneous Plants and Chernozem Soils of the Kamennaia Steppes.** (Russian.) R. Kh. Aidinian. *Pochvovedenie*, 1953, no. 9, Sept., p. 49-61.

Amounts of trace elements derived from leaves of oak, birch, and maple trees were determined. Tables. 20 ref.

**7375* Glue and Gluing. XXIV.** John E. Hyler. *Southern Lumberman*, v. 188, Jan. 15, 1954, p. 41-42, 44, 46.

Discusses cleaning, temperature effects, handling of catalyst, and modern mixers. Photographs, table.

**7376* The Electric Moisture Meter for Wood.** Harold Tombach. *Southern Lumberman*, v. 188, Jan. 15, 1954, p. 63-64, 66-68, 70, 72.

How to choose it and what to expect of it. Photographs, diagrams.

**7377* Variation of Drying Rates of Individual Driers Through the Drier Section.** A. E. Montgomery. *Tappi*, v. 37, Jan. 1954, p. 1-13.

Provides reliable information on variation of drying rates through drier section of paper and board machines under varied conditions. Permits an intelligent determination of moisture content of the sheet at any point in a proposed machine and actual quantitative distribution of evaporation along any drier section. Graphs, tables.

**7378* Some Factors in the Color Reversion of Bleached Secondary Fiber.** H. P. Bailey, J. J. Forsythe, and E. F. Andrew. *Tappi*, v. 37, Jan. 1954, p. 14-18.

Experiments with three different de-inking agents show in general there was at least color reversion with peroxide and the most with sodium hydroxide with sodium carbonate being intermediate. Tables.

**7379* Beater Additives in Papermaking.** P. B. Davidson. *Tappi*, v. 37, Jan. 1954, p. 18-24.

Several so-called beater additives were evaluated for their influence on engine sizing of paper. Tables, graphs.

**7380* Suitability of Wood Pulp for Acetylation.** J. R. Proffitt, H. M. Graham, E. R. Purchase, and R. C. Blume. *Tappi*, v. 37, Jan. 1954, p. 28-32.

Discusses disintegration of dried pulp or extraction of moisture from undried pulp, activation, acetylation, sampling, and catalyst neutralization. Diagrams, graphs. 5 ref.

**7381* Establishment of Correlations for the Three-Stage Bleaching of Semichemical and Sulphite Pulps and Blends Employing a Modified Permanganate Method.** P. L. Leemhuis. *Tappi*, v. 37, Jan. 1954, p. 32-38.

Bleaching investigations were carried out on a series of mixed hardwood neutral sodium sulphite semichemical pulps of widely varying cooking degree, on some spruce sulphite pulps, and on several blends of these two types of pulps. Graphs, tables. 3 ref.

**7382* Stain Technique for Differentiating Hardwood and Softwood Mechanical Pulps.** Walter E. Spearin and Robert C. Dressler. *Tappi*, v. 37, Jan. 1954, p. 39-42.

Convenient technique for making this differentiation was developed by employing Mäule strain reaction. Graphs, tables. 6 ref.

**7383* Thermal Dissolution of Wood Cellulose.** (Russian.) V. N. Kozlov and N. I. Koroleva. *Zhurnal Prikladnoi Khimii*, v. 26, no. 10, Oct. 1953, p. 1061-1066.

Best solvent is a mixture of 35% ethyl alcohol, 35% benzene, 10% tar oils, and 20% solvent products. Wood can be transformed into liquid and gaseous products by thermal action. Tables. 4 ref.

*Books and Miscellaneous Publications*

**7384 Wood Properties That Affect Paint Performance.** F. L. Browne. Paper from ORGANIC PROTECTIVE COATINGS. p. 226-259. 1953. Reinhold Publishing Corp., New York. (TP935 V89o)

Presents discussion on serviceableness of exterior paints, based on the kinds and quality of wood. Photographs, diagrams, tables, micrographs, graphs. 36 ref.

***See also:***
**5887** (beetle control in forests)
**5914** (relations of tree growth to soil profile)
**6472** (survey of pulp and paper industry)
**7273** (water and waste in wood pulp industry)

IMPROVED TITANIUM FURNACE

This experimental arc furnace marks a new advance in the battle of titanium production. It was developed in connection with research on the production of homogeneous titanium alloys in a single melting operation. The furnace was designed with a special liner at the melting zone and a reflecting dome over the melt. These special features so increase the efficiency that the molten portion of the ingot is double that obtained in conventional furnaces of the same size. Ingots weighing as much as 100 pounds, and with improved uniformity, can be withdrawn continuously from the bottom of the furnace. The furnace was designed and built at Battelle for use in research studies being conducted for the Republic Steel Corporation.

BATTELLE INSTITUTE was founded by the will of Gordon Battelle as a memorial to the Battelle family. The Battelles were among the first settlers of Ohio and were prominent in the development of the state's iron and steel industry.

Gordon Battelle, last of the family line, was impressed with the benefits to be derived from industrial research and left his estate for the building and endowment of an Institute "for the purpose of education . . . the encouragement of research . . . and the making of discoveries and inventions for industry." The Institute began operations in 1929.

As established, Battelle provides, on a not-for-profit basis, the physical plant, equipment, and personnel for conducting research. The great bulk of it is applied research conducted for industry and government.

In keeping with its educational function, the Institute also conducts fundamental or basic research. The results of much of this research are published for the general encouragement of science and industry, and to benefit the public welfare.

Fields of research at Battelle include agriculture and practically all the industrial and engineering sciences.

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